

**Summary Report of the Meeting of the  
U.S. Environmental Protection Agency  
Science Advisory Board  
Contaminated Sediments Science Plan (CSSP) Review Panel**

U.S. Environmental Protection Agency  
Washington, D.C.  
October 30-31, 2002

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**U.S. Environmental Protection Agency  
Science Advisory Board  
Contaminated Sediments Science Plan Review Panel**

Summary Minutes of Public Meeting  
October 30 - 31, 2002

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**Committee:** Contaminated Sediments Science Plan Review Panel of the U.S. Environmental Protection Agency's Science Advisory Board (SAB). (See Panel Biographies - Appendix C.)

**Date and Time:** October 30, 2002, from 8:30 a.m. to 5:30 p.m. and October 31, 2002, from 8:00 a.m. to 2:00 p.m. Eastern Time (See Federal Register Notice - Appendix B).

**Location:** Science Advisory Board Conference Room, US EPA, Ariel Rios North, Room 6013, 1200 Pennsylvania Avenue, Washington, DC.

**Purpose:** To review and develop responses to EPA's charge to the Science Advisory Board for peer review of the Contaminated Sediments Science Plan (See Meeting Agenda - Appendix A.)

**Attendees:** Mr. Lawrence Martin (Designated Federal Official - SAB Staff); Committee Members (see Appendix C); Dr. Vanessa Vu (SAB Staff Office Director); Dr. Lee Hoffman (Office of Solid Waste and Emergency Response); Dr. Michael Shapiro (Science Policy Council). (See List of Attendees - Appendix D.)

**Meeting Summary:**

The meeting followed the issues and general timing as presented in the meeting Agenda, except where otherwise noted (see Meeting Agenda - Appendix A and Transcript - Appendix H). There were two written comments submitted to the Committee, and there was one request made to present public comments during the meeting.

**Welcome and Introductions** - Dr. Michael McFarland, Chairman, opened the meeting at 8:30 a.m. on October 30, welcoming members and consultants (Appendices C and D), and reviewed the meeting agenda (Appendix A). Mr. Lawrence Martin, Designated Federal Official for the Contaminated Sediments Science Plan Review Panel, noted that a complete set of materials was available at the meeting for reference purposes. He reviewed the process of SAB panel selection and read the conflict of interest regulations under 18 U.S.C. 208, which apply to members of the Panel. No "particular matter" conflicts of interest were identified. Then he requested that panel members introduce themselves and make a voluntary statement for the record regarding their research interests and experiences related to the review topic.

**Discussion of the Panel's Review of the Contaminated Sediments Science Plan:**

After hearing a briefing on the Contaminated Sediments Science Plan (Appendix E) and one public comment (Appendix F), the Panel began developing its response to the Charge Questions posed by EPA. It soon became apparent that the recommendations of the Panel would

exceed the scope of the Charge Questions and include comments on the preparation of the CSSP and the general design of a science plan.

The Panel made several recommendations for improving the CSSP. After hearing from the CSSP Work Group Chair, it was agreed that the actual intent of the Plan was not completely reflected in its stated goals; therefore, the Panel suggested that the intent and the goals of the Plan be reconciled. They also offered that for the Plan to better meet Agency needs, it should state the rationale used to support both the identification of science needs and recommended science activities. The Plan should articulate the process used to establish the science priorities set forth in Chapter 4. Panel members also advised that in an effort to accurately denote the content of the document, the CSSP's title should be changed to indicate that it is not a veritable science plan; the title of Chapter 2 should also be updated to "Overview of major sediment issues across the Agency" or some other title more indicative of the chapter's content. The CSSP could also benefit from a description of the regulations driving the science needs and the major barriers to decision making at contaminated sediment sites, as identified by stakeholders in the field. The Panel suggested that the CSSP is useful as a point of departure for discussion of the salient points that should be addressed by a general science plan.

For such future science plans, the Panel emphasized that the Agency must consider a systematic process for not only developing a plan but also for prioritizing science activities and implementing the plan. The Panel recommended that sufficient financial and personnel resources be devoted for Agency science planning. A future plan should include a more explicit process for interagency coordination during prioritization and execution, complemented by a robust system for outreach and technology transfer. Finally, the Agency should reconsider the frequency of plan review, which should be flexible enough to incorporate new technologies, scientific methods, and knowledge as they become available.

Individual Panel members drafted specific responses to the Charge Questions (see Appendix G) prior to the meeting, and at the meeting, the Panel developed collaborative responses to each question. The Panel did not provide a systematic review for the science topics discussed in the CSSP, but instead focused on more global issues during the deliberation.

**Action item:**

The Panel has scheduled a teleconference for November 22, 2002 to: (a) Discuss drafts of sections of the Panel Report; (b) recommend revisions to the Panel Report; and (c) clarify specific points of concern for further discussion and resolution.

At 1:56 p.m. on October 31, Mr. Lawrence Martin adjourned the meeting.

Respectfully Submitted:

Certified as True:

Signed  
(Mr. Lawrence Martin)  
Designated Federal Official  
**1.0 INTRODUCTION**

Signed  
(Dr. Michael McFarland)  
Panel Chair

## **1.1            Meeting Purpose**

U.S. Environmental Protection Agency's (U.S. EPA) mission is to protect human health and to safeguard the natural environment upon which life depends. Sediments are an integral component of aquatic ecosystems, and contaminants in sediments pose a threat to human health, aquatic life, and the environment. Humans, aquatic organisms, and other wildlife are at risk through direct exposure to pollutants or through consumption of contaminated fish and wildlife. Exposure to these contaminants is linked to cancer, birth defects, neurological defects, immune dysfunction, and liver and kidney ailments. Contaminated sediments may also cause economic impacts, at both the local and regional level, on the transportation, fishing, tourism, and development industries.

Sediment contamination is an issue that cuts across offices and jurisdictions throughout the Agency, other Federal agencies, state agencies, and tribes. In response to the cross-cutting and multi-faceted dimensions of the issue, U.S. EPA's Science Policy Council (SPC) initiated in 2000 the development of the Contaminated Sediments Science Plan (CSSP or "the Plan"). The CSSP is intended as a mechanism for the U.S. EPA to develop and coordinate Agency-wide science activities in the contaminated sediments area. Along with the EPA's contaminated sediments science activities database, this plan provides an analysis of the current Agency science activities in this area, identifies and evaluates the science gaps, and provides a strategy for filling these gaps. An electronic version of the CSSP is available at: <http://www.epa.gov/sab/panels/cssprpanel.html>.

The CSSP expresses three goals in an effort to provide a strong scientific basis for addressing contaminated sediments:

- (1) To develop and disseminate the tools and science necessary to address the management of contaminated sediments;
- (2) To enhance the level of coordination and communication of science activities dealing with contaminated sediments across the EPA's Program and Regional Offices and the Office of Research and Development; and
- (3) To develop an effective, cost-efficient strategy to promote these scientific activities and research.

EPA has solicited comments from its Science Advisory Board (SAB), which has

convened a panel of experts to evaluate all aspects of the draft CSSP. EPA has charged the CSSP Review Panel to respond to the following questions:

- 1) The CSSP is the first official Agency science plan of its kind designed to address a significant cross-agency environmental issue in a systematic and integrated fashion. Chapter One of the CSSP discusses the goals, objectives, and how the CSSP relates to the Agency's mandate. Are the goals and objectives of the plan understandable and appropriate to the subject, and does the CSSP adequately convey the need for such a planning document?
- 2) Chapter Two of the CSSP provides an overview of the contaminated sediment problems and issues across the Agency. The brief description of issues in Chapter Two is meant to provide the overall context for the more detailed discussion of specific science needs given in Chapter Three. Are the major areas of contaminated sediments science identified in Chapters Two and Three (sediment site characterization, exposure assessment, human health effects and risk assessment, ecological effects and risk assessment, sediment remediation, baseline and post-remediation monitoring, risk communication, and information management and exchange activities) addressed adequately? Are any major areas missing?
- 3a) Chapter Four provides the key recommendations for future Agency priority science activities, including research, from the identified research needs and discussion in Chapter Three. For each recommendation, critical U.S. EPA partners and the immediate or long-term nature of the science activity are proposed. Do the CSSP recommendations meet the CSSP's goals and objectives?
- 3b) Are the key recommendations clearly defined and appropriate to address the identified CSSP science needs, and are the priorities identified appropriate?
- 3c) Are the CSSP's recommendations responsive to the identified need for coordination, particularly intra-agency?

The CSSP Review Panel (or "the Panel") previously met on October 17, 2002, via teleconference and met in person on October 31-31 to conduct a review of an Agency draft document entitled, Contaminated Sediment Science Plan, June 13, 2002 draft, prepared by U.S. EPA. The meeting was held in the SAB Conference Room, US EPA, Ariel Rios North, Room 6013, 1200 Pennsylvania Avenue, Washington, DC. This meeting was announced in a Federal Register notice (FR01OC02-73) on October 1, 2002 (see Appendix B). During this meeting, the Panel: (a) Engaged in dialogue with appropriate officials from the Agency who are responsible for the Plan's preparation; (b) discussed panelists' written responses to elements addressed by the

charge questions; (c) received public comments as appropriate; and (d) assembled and revised written drafts to complete a rough draft written review of the Plan.

## **1.2            Meeting Agenda**

The final meeting agenda is presented in Appendix A. The SAB began the meeting with opening remarks and an introduction of CSSP Review Panel members and other attendees. The Chair of the CSSP Work Group briefed the Panel on the development of the Contaminated Sediments Science Plan and the activities leading to the Plan. A discussion period followed this presentation, in which the Panel asked for clarification of certain issues from the speaker. Next, a public commenter presented his opinions regarding the Plan and fielded questions from the Panel.

The Panel then began discussing their responses to the EPA Charge Questions. At the end of Day 1, the Panel Chair summarized the points of consensus and nonconsensus reached during the meeting. Throughout the first and second days, the Panel heard clarifying remarks from EPA staff involved in the activities described in or leading to the CSSP. On Day 2, the Panel summarized, discussed, and clarified their principal findings and redrafted their responses to the Charge Questions. Final revisions of responses were submitted to the DFO, and the meeting was adjourned.

## **1.3            Meeting Report Summary**

This report summarizes the CSSP Work Group briefing, public comment, and development of the Panel's responses to EPA's charge questions. The report is organized as follows:

- Section 2 summarizes the opening remarks made by the SAB Staff Office Director, the Panel Chair, and the DFO.
- Section 3 introduces the Panel members and the meeting attendees. Panel biographies and a list of attendees can be found in Appendices C and D, respectfully.
- Section 4 presents a recapitulation of the introductory remarks of Dr.

Michael Shapiro, a representative from EPA's Science Policy Council, including clarification questions from the Panel.

- Section 5 captures the CSSP Work Group's presentation and the Panel's subsequent discussion. Slides of the presentation are located in Appendix E.
- Section 6 contains the synopsis of a public commenter's advise to the Panel and CSSP Work Group. A written version of these comments, along with one additional public comment, can be found in Appendix F.
- Section 7 describes the process of developing Panel responses to the EPA Charge Questions. Written responses provided by individual Panel members are located in Appendix G.
- Section 8 outlines the talking points and Panel discussion that led to the development of a consensus. Documentation of this consensus can be found in Appendix H.
- Section 9 describes the closing remarks of the Panel Chair and the DFO.

## **2.0 WELCOME AND OPENING REMARKS**

### **2.1 Dr. Vanessa Vu - SAB Staff Office Director**

After Mr. Lawrence Martin opened the meeting, Dr. Vanessa Vu welcomed the Panel members, the public, and EPA staff to the public meeting of the SAB Review Panel for the Contaminated Sediments Science Plan (CSSP). In particular, she recognized Mr. Michael Shapiro, the representative of EPA Science Policy Council, for taking the time to speak with the Panel.

### **2.2 Dr. Michael McFarland - Panel Chair**

Dr. Mike McFarland echoed Dr. Vu's welcome and comments and explained that the Panel meeting represents the first face-to-face discussion of the Panel's responses to the Charge Questions provided by EPA for peer review of the CSSP. At the end of these two challenging days, Dr. McFarland hoped to provide a set of practical, scientifically defensible recommendations for the CSSP and future science plans, which will be of value to EPA and the CSSP work group.

### **2.3 Mr. Lawrence Martin - Designated Federal Officer**

Mr. Lawrence Martin addressed matters related to conflict of interest and explained the formation of the Panel. The SAB's Panel formation process is outlined in the publication *Overview of the Panel Formation Process at the Environmental Protection Agency Science Advisory Board* (EPA-SAB-EC-02-010), and the specific process used to select CSSP Review Panel members can be found on the web at <http://www.epa.gov/sab/pdf/cssprpdeterminamemo.pdf>. The selection of Panel members involved the consideration of conflict of interest, the need for a balanced review panel, and the availability of those nominated. Mr. Martin explained that the charge to the CSSP Review Panel does not represent a Particular Matter and that conflict of interest regulations under 18 U.S.C.

208 apply to members of the Panel. Regulations concerning “appearance of lack of impartiality” under C.F.R. 2635.502 apply to the Panel as well.

Mr. Martin explained that the Panel will focus on developing responses to the EPA charge to the Science Advisory Board for peer review of the CSSP. During the discussion, the Panel should consider the research necessary to meet current and future Agency science needs.

### **3.0**

#### **INTRODUCTION OF CSSP REVIEW PANEL MEMBERS**

Following the opening remarks, Dr. McFarland asked the Panel members to introduce themselves and describe their areas of expertise. Panel biographies can be found in Appendix C. Dr. McFarland also asked any members of the public and other EPA staff members attending the meeting to identify themselves and their affiliation. One public commenter was present, along with several members from the Office of Research and Development (ORD) and other EPA offices.

#### 4.0

#### **INTRODUCTORY REMARKS**

*(Corresponds to #1 in the transcript - Appendix I, p. I-23)*

#### 4.1

#### **Mr. Michael Shapiro - EPA Representative of the Science Policy Council**

Mr. Michael Shapiro provided remarks on behalf of the EPA Science Policy Council. He noted that the issue of contaminated sediments presents many challenges. He explained that EPA has the need for an integrated science plan to demonstrate the most important scientific barriers that must be overcome in order to address those problems. The CSSP represents the first Agency attempt to produce an integrated science plan that considers issues that span media, EPA offices, and external agencies. The science plan will not alter the size of the EPA budget but will enable the Office of Research and Development (ORD) to focus resources on the areas of research most pertinent and applicable to increasing certainty and success in the remediation of contaminated sediments. Mr. Shapiro explained that the Review Panel should attempt to determine the ideal mix of research activities to develop the best tools to understand the role of contaminated sediments in environmental quality. To do this, information gaps must be identified along with the proper research to fill these gaps.

#### 4.2

#### **CSSP Review Panel Discussion**

After Mr. Shapiro concluded his remarks, the Panel members posed questions regarding the intent and use of the CSSP. Mr. Shapiro explained that the Plan and the recommendations of the Panel will affect annual and long-term resource allocation for research activities and will help ORD to determine the priority of different research projects. Ideally, the Panel would comment on the Plan's scientific and procedural framework as well as the subject matter regarding the science addressing contaminated sediments.

Several members of the Panel expressed their belief that the CSSP is not a science plan as it purports. Instead, it appears as a list of science activities lacking a clear framework or explanation of the planning process. Mr. Shapiro explained that he had described what he would like the document to be and not, perhaps, what it actually is. He postulated that a list of activities could be an important step toward achieving the Plan's purpose, but the Plan should

also include a framework with concrete linkages in the planning and prioritization processes. Ideally, future documents and science plans will incorporate this strategy.

Dr. Vu explained that EPA's Strategic Plan delineates ten specific goals, one of which is supporting management decisions with sound science. Each office has its own plan to achieve this goal, and perhaps the CSSP is one step toward achieving it. Dr. McFarland described the planning process as evolutionary and recognized that it will include the opportunity for refinement.

**5.0 CSSP WORK GROUP BRIEFING - DR. LEE HOFFMAN**  
(Corresponds to #2 in the transcript - Appendix I, p. I-41)

**5.1 Contaminated Sediments Briefing**

Dr. Lee Hofmann, the CSSP Work Group Chair, thanked the Panel for what already has been an informative discussion. She explained that because the CSSP was intended as an internal EPA document, it does not contain the level of detail or background information that the Panel may have expected. The Plan is a work in progress, which represents a considerable Agency effort, as there was no prior template for such a science plan. The CSSP has a companion internal document, the “Science Planning Handbook,” which was initiated by the Science Policy Council (SPC) and has been developed simultaneously along with the CSSP.

Dr. Hofmann narrated a Power Point presentation, which described the development and implementation of the Plan. Copies of the slides used in this presentation can be found in Appendix E.

Dr. Hofmann began the presentation by explaining that according to the *National Sediment Quality Survey* (1997), available data indicate potential sediment contamination in all regions and states. These contaminated sediments pose a potential threat to human, wildlife, and ecosystem health. Dr. Hofmann presented a list of studies, reports, and activities related to contaminated sediments that eventually led to the conception of the CSSP.

Dr. Hofmann continued by describing the CSSP as a product of the SPC and the first Agency-wide science plan. It represents a response to the Federal Management and Fiscal Integrity Act (FMFIA), which identified an absence of sound science as a foundation for EPA policy. The need for a science plan is evident from the cross-cutting nature of the contaminated sediments problem. Addressing this problem will require attention to cross-program and cross-media communication and coordination. The CSSP aims to facilitate the coordination, planning, and budgeting processes across different offices for sediment research and remediation activities.

Dr. Hofmann outlined the uses and goals of the science plan next. Primarily, it

intends to coordinate and focus research efforts within EPA. Secondly, it will facilitate discussions with other partners involved in managing contaminated sediments, including agencies and stakeholders outside of EPA. Dr. Hofmann commented that perhaps the CSSP Work Group articulated more goals than can realistically be achieved. The Plan itself states three main goals:

1. Development and dissemination of tools and science necessary to address the management of contaminated sediments.
2. Enhancement of the level of coordination and communication of science activities across the Agency.
3. Development of an effective, cost efficient strategy to promote these scientific activities and research.

The Plan was written and organized to address EPA as the intended audience. The recommendations involve only two time-frames: the short- and long-term, with no intermediate. The risk assessment paradigm served as an organizing principle for the entire Plan. In addition, the CSSP focused on key issues and excluded activities and problems being dealt with in other EPA guidance or plans. Dr. Hofmann conceded that perhaps the Plan could better reference other documents used in developing the CSSP.

Dr. Hofmann explained that stakeholder input received through workshops and forums was incorporated into the development of the Plan, along with inter-agency discussions and an intra-agency research review. The Work Group aims to revise the CSSP by March 2003; the Plan will then be subject to SPC approval.

The implementation of the Plan will occur through the Contaminated Sediments Management Committee. This committee is tri-chaired by senior managers from OSWER, OW, and ORD and is responsible for implementing the CSSP, coordinating on-going projects, and facilitating the resolution of cross-program policy and technical issues. The recommendations in the Plan will affect ORD's multi-year plans along with related regional and program planning.

## **5.2 CSSP Review Panel Discussion**

Discussion began when a Panel member raised the issue of authority. Dr.

Hofmann explained that Linda Fisher, as Deputy Administrator of the SPC, has final authority to authorize and implement the CSSP.

The concept of cost-efficiency was also introduced in the presentation, and a Panel member questioned whether the term applies to the funding and prioritization of research or funding cross-agency initiatives. Dr. Hofmann answered that the overall budget would not change, but the SPC seeks to avoid duplicative research in the area of contaminated sediments. The Contaminated Sediments Management Committee will be tasked with implementing the plan in the most cost efficient manner. The first step, however, is to inventory current activities in this area and proceed from there. Dr. Hofmann has already observed a shift in ORD resources toward the contaminated sediments issue as a result of the draft CSSP.

A Panel member observed that the document did not describe the process of Plan development nor the Plan's use. Perhaps more background information should be explicitly stated in the document; this would have been helpful to the Panel in establishing the level of review. Dr. Hofmann agreed that more information could be incorporated into the document, even though the Work Group's intention was initially to coordinate activities within EPA.

Another Panel member expressed concern that the Plan did not define the physical boundaries of the unit of sediment for sampling or remediation purposes. He explained that the issue of scale is important when extrapolating laboratory results focused on small areas of sediment contamination to expansive areas of sediment for remediation. Dr. Hofmann agreed that the issues involved when dealing with contaminated sediments are broad and assured the Panel that impacts of all scales are being considered.

Several Panel members questioned the Work Group's ability to identify priorities in contaminated sediment management without having knowledge of the activities underway outside of the Agency. Communication and coordination is imperative to avoid duplicative research and implementation efforts. Dr. Hofmann acknowledged that the Work Group members are aware of activities external to EPA, but this awareness was not conveyed in the document. She has dealt with many stakeholders, including state and regional representatives, through

personal communication and initial conversations. ORD and the Work Group proceeded with compiling a list of research needs only after consulting with others from all levels to define pressing issues and problems.

Dr. McFarland observed that the presentation argued well on behalf of the need for a plan. Dr. Hofmann elaborated by speculating that without such a plan, ORD could not as easily focus research on pertinent matters. Even in its draft form, the Plan has already helped improve coordination. Dr. Hofmann closed the discussion by emphasizing that the CSSP Work Group would benefit from the Panel's recommendations on a general science plan as well as recommendations regarding how the CSSP can be improved.

## 6.0

### **PUBLIC COMMENT**

*(Corresponds to #3 in the transcript - Appendix I, p. I-73)*

## 6.1

### **Dr. Robert Engler - U.S. Army Corps of Engineers**

Dr. Robert Engler was the sole public commenter present at the public meeting of the CSSP Review Panel. A written version of his comments are located in Appendix F. Another public commenter, SSC San Diego, Department of the Navy, provided written comments, which are also located in Appendix F.

Dr. Engler began by emphasizing the definite need for a coherent plan addressing contaminated sediments issues. He spoke from the perspective of an outside party but also as an EPA partner. He explained that the U.S. Army Corps of Engineers (USACE) has been involved in water and sediment management for several decades, and they prefer the standard risk-based approach. In partnering with EPA, USACE has set global standards in sediment assessment technology, and all of their accomplishments and research activities are available on the world wide web.

In regards to the CSSP, Dr. Engler criticized the document for not including a logical strategy for implementation. As it stands, the Plan is merely a list of “tactile entities.” Eventually, the Plan must be implemented through program offices, yet this level of implementation is not mentioned in the document. The current state of the science is not conveyed or translated into a coherent implementation manual.

Despite these criticisms, Dr. Engler noted that the document has many positive characteristics as well. It is helpful to chronicle the ongoing and completed activities in the field of contaminated sediments. He stated that approximately 80% of the items in the executive summary are currently being carried out or are soon to be undertaken by other agencies.

Dr. Engler continued by chronologically evaluating the plan by chapter. In Chapter 1, he claimed that the 1997 Sediment Survey was a poor basis on which to build a plan, due to the age of the data and the lack of consistent QA/QC procedures. He supported the use of

the risk paradigm in Chapters 2 and 3 but expressed that it should appear initially in Chapter 1. In Chapter 4, the need for a coherent strategy is most apparent. The Plan does not articulate a meaningful way to coordinate activities inter- or intra-agency. Communication channels should be spelled out to avoid ad hoc, project-specific communicative forums. The concept of listing research activities in the Plan's Appendix is valid, but in its present state, this section of the document is dated and without a logical structure.

## **6.2            CSSP Review Panel Discussion**

The Panel addressed the issues raised in Dr. Engler's comments and dealt principally with the need for better communication and coordination. Members agreed that a formal inter-agency group dedicated to dealing with contaminated sediments should be formed. One Panel member suggested examining other inter-agency activities that have proven fruitful, such as the communication strategies used to tackle global climate change.

Dr. Engler relayed what he believed to be the most apparent research need, involving the relationship between sediment/water physics and exposure. USACE identified this area of research because these physical relationships represent the most uncertain parameters in the risk model. He believes that EPA should handle this research, as the Agency is the lead on Superfund.

## **7.0 DEVELOPING RESPONSES TO EPA CHARGE TO THE SAB CSSP REVIEW PANEL**

### **7.1 Developing Response to Charge Question No. 1**

*(Corresponds to #4 in the transcript - Appendix I, p. I-96)*

Dr. McFarland introduced the first Charge Question, which reads:

The Contaminated Sediments Science Plan (CSSP) is the first official Agency science plan of its kind designed to address a significant cross-agency environmental issue in a systematic and integrated fashion. Chapter One of the CSSP discusses the goals, objectives, and how the CSSP relates to the Agency's mandate. Are the goals and objectives of the plan understandable and appropriate to the subject, and does the CSSP adequately convey the need for such a planning document?

The Panel indicated that they could only address the Charge Question to a limited extent, as there was not adequate background information to offer proper judgment and advice. Panelists suggested that the Plan include: a rationale of the prioritization process, reconsideration of the intended audience, an explanation of a process to involve internal and external stakeholders, a definition of the term “cost efficient,” a new chapter to modify the list of activities to include an implementation strategy, and direction on data interpretation related to these science activities. The Panel agreed that the goals and objectives were understandable and appropriate to a certain degree, but the Plan must further develop these goals and objectives. They also felt that if EPA considers a science plan a serious need, then the Agency must allocate sufficient resources to ensure that the process is thorough and complete. Details on the Panelists’ discussion are provided below, followed by a summary of Panel responses.

#### **7.1.1 CSSP Review Panel Discussion**

Before Dr. McFarland could officially open the floor for discussion of Charge Question No. 1, a Panel member remarked that in order to provide the most useful information for the CSSP Work Group, the Panel would need to raise issues outside of the Charge Questions. He anticipated that the comments would fall into three categories: 1) comments addressing large-scale questions related to the structure and content of a general science plan, 2) general comments outside the scope of the Charge Questions regarding the CSSP and its use, and 3)

comments specific to the Charge Questions. Dr. McFarland agreed, stating that he anticipated the Panel would raise issues beyond the Charge Questions.

The two Panel members who provided written responses to Charge Question No. 1 summarized their opinions for the Panel. They stated that the CSSP lacks the framework for cross-agency coordination, prioritization, and management. Before the CSSP confronts the complicated problem of contaminated sediments management, it should first establish the characteristics of a science plan. Such a plan should include a considerable amount of preparation in addition to a process for updating and communicating the plan. As it stands, the CSSP contains some degree of these elements, but it conveys them in a haphazard, scattered manner. The Panel's response to Charge Question No. 1 centers on procedural issues involving the CSSP Work Group's examination of past and current research and the implementation of the Plan. (See Appendix G for a draft response to Charge Question No. 1.)

Following this summary, the Panel discussed the content and structure of the Plan itself, their vision for a general science plan, and their response to the Charge Question. Most comments on the Plan itself included the need for an explanation of the rationale used to establish research priorities, an emphasis on cross-agency communication and coordination, a reconsideration of the audience of the Plan, and efficient use of resources. The comments regarding a general science plan dealt with the need for a conceptual framework and the role of stakeholders in the process. The Panel's response to the Charge Question consisted of a combination of these elements, as described in the previous section.

### **Comments pertaining to the CSSP**

The Panel agreed that before they could determine whether or not the goals and objectives of the Plan are understandable and appropriate, they would need an explanation of how the Plan was developed and what process the CSSP Work Group used to gather information about research activities in the field of contaminated sediments. Dr. Hofmann explained that the Work Group consulted program offices, held meetings, conducted pilot projects, and compiled reports in an effort to include all relevant research and activities. However, this process was not

articulated in the document, and the Panel suggested a description of this process is needed to inform the reader and support the priorities listed as part of the Plan. The Panel also proposed that the Work Group include case studies or strawman scenarios to demonstrate how the Plan would be applied.

Many comments indicated that the Plan should describe mechanisms to facilitate communication among other agencies and stakeholders. Panelists expressed that greater outreach and coordination is necessary when addressing such a cross-cutting issue as contaminated sediments. The Panel members voiced differing opinions on the role stakeholders could play in the planning process. Some agreed that they should be brought in during early planning stages to identify important issues and provide needed information. Perhaps they could even aid in developing a conceptual model for an implementation framework. However, others claimed that stakeholders would not be able to view the contaminated sediments problem with the broad perspective necessary to develop a science plan. These members claimed that EPA should first examine internal problems and priorities and then look externally to determine if other activities should be added or eliminated. The Panel advised that however EPA decides to address the stakeholder issue, they must consider the impacts on their credibility if stakeholders are initially excluded from the process and must also understand the need to define the problem with interested parties to avoid miscommunication in the end.

Although the CSSP was intended to be an internal EPA document, most Panel members felt that it should be written with more background information to inform the reader, and some even suggested that the document should not be internalized at all. In its final form, the document will be a statement of how EPA handles contaminated sediments. The Panel suggested that because this subject has such far-reaching implications and impacts, the Plan should not remain internalized and should be used to its fullest extent. Other Panel members offered that the CSSP could begin as an internal document and then provide an external impetus. However, even if this is the case, the Plan should not merely assume that the internal audience has the necessary knowledge to utilize the document if it is to be used appropriately in improving the planning process.

Some Panel comments equated the priority setting process to the identification of areas of greatest uncertainty. The overall objective of focusing research on uncertainty is understandable, but the Plan must articulate how to identify uncertainties, prioritize them, and then implement a strategy to reduce them. EPA must also identify the barriers to reducing risk. Implementation should proceed from problem definition, to the examination of research activities addressing the problem, and then to the prioritization of these activities. An algorithm must be identified to connect these stages to final Plan implementation; otherwise, the Agency is left with only a list of priorities.

The Panel noted that after the areas of uncertainty are identified, EPA must attempt to address them in the most “cost-effective” manner, as stated in the Plan. The Panel was unclear of the implications of this term, and Dr. Hofmann defined it as making better decisions that both lower costs and lower risks. The Panel agreed that this explanation should be explicitly stated in the document.

One Panel member was concerned with the interpretation of analytical measurements gathered through research activities. The Panelists felt that EPA must define what it is attempting to characterize while rationalizing the need for this information. In the context of contaminated sediments, many methods have been validated, yet the Plan does not define the exposure unit of interest nor the characteristics to be examined. The Panelists requested that EPA clarify the information it requires to address problems with contaminated sediments, realizing that its motivation and goals may differ from that of other agencies and stakeholders.

The Panel offered suggestions for items to be included in a new “Chapter 5” of the CSSP. A member of the CSSP Work Group within ORD suggested the Plan include a description of the barriers and difficulties typically encountered when dealing with contaminated sediments. In addition, a Panel member emphasized the need to identify the science that will be required to address the stated issues. This science should not merely respond to the most vocal stakeholders but should address the areas of greatest uncertainty. The role of EPA as a manager of this science could be discussed in Chapter 5. This addition would allow EPA to progress from

a list of activities to a characterization of the science and a strategy for implementation of those activities.

### **Comments addressing the characteristics of a general science plan**

The Panel agreed that the CSSP should not be used as a model for future science plans but does provide a starting point for the development of such a plan. One member suggested that the Plan include a discussion about the characteristics of a science plan and the process for arriving at such a plan. This would involve the description of a framework for the planning process, encompassing the interaction between EPA offices, stakeholders, and external agencies. This framework would enable the Agency to identify, prioritize, and execute research activities pertinent to addressing the problems of contaminated sediments in a cost efficient manner.

As evidenced by previous comments, the Panel noted that one of the most important characteristics of a general science plan is the establishment of a strategy to define and solve a specific problem. One member suggested a framework involving the “Six Ps” of Process, Problem, Preparation, Prioritization, Planning, and Protocol. The Process includes the interaction of external and internal stakeholders defining the Problem. Preparation involves the examination of past and present research activities addressing this Problem. Prioritization determines the order of importance of additional research, and Planning outlines a strategy to gather information and solve the Problem. The Protocol guides implementation, allowing the plan to evolve over time. This is an iterative process that may involve reprioritization once the algorithm is completed. The current CSSP has gone through some of these stages to a certain degree, but it lacks a prioritization and implementation plan. The “Six Ps” represent merely one suggestion for a process, but EPA must ultimately decide upon a final algorithm for a general science plan.

### 7.1.2 CSSP Review Panel Responses

#### Main points pertaining to the CSSP:

- The CSSP should include a rationale for the prioritization of the activities it proposes.
- The Plan should specify how the actions and priorities of agencies external to EPA have been accounted for and documented.
- The Plan should incorporate substantial interagency coordination and interaction to efficiently utilize available resources.
- The Plan should clearly define terms such as “cost efficient.”

#### Main points addressing a general science plan:

- A science plan should lay out a framework for prioritization and implementation. It should not merely be a list of science/research activities.
- The “Six Ps” could be considered as a basis for a planning and implementation framework.

#### Main response to Charge Question No. 1:

- The Plan does not provide enough information to justify the need for such a plan.
- The Plan’s goals and objectives seem appropriate to a certain degree, but they do not go far enough to explain the reasoning behind these goals and objectives.

### 7.2 Developing Response to Charge Question No. 2

*(Corresponds to #5 in the transcript - Appendix I, p. I-147)*

Dr. McFarland introduced the second Charge Question which reads:

Chapter Two of the CSSP provides an overview of the contaminated sediment problems and issues across the Agency. The brief description of issues in Chapter Two is meant to provide the overall context for the more detailed discussion of specific science needs given in Chapter Three. Are the major areas of contaminated sediments science identified in Chapters Two and Three (sediment site characterization, exposure assessment, human health effects and risk assessment, ecological effects and risk assessment, sediment remediation, baseline and post-remediation monitoring, risk communication, and information management and exchange activities) addressed adequately? Are any major areas missing?

The Panel member responsible for drafting a response to Charge Question No. 2 first summarized his position for the Panel. A written draft response to this question can be found in Appendix G. The Panelist noted that many issues included in his response had already been raised by the Panel during their discussion of Charge Question No. 1. He explained that the list of science activities is reasonable but incomplete, as it includes no prioritization scheme or

implementation strategy. Several pertinent topics were also not addressed by the Plan, and the emphasis on some of the topics discussed within the document was misplaced.

### **7.2.1 CSSP Review Panel Discussion**

During the ensuing discussion, other Panel members elaborated on these remarks, and their comments addressed either the first or second part of Charge Question No. 2. The responses to the first part of the question (i.e., Are the major areas of contaminated sediments science identified in Chapters Two and Three addressed adequately?) covered topics dealing with the risk paradigm, prioritization tactics, communication tools, stakeholder involvement, site characterization for exposure assessment, and human health effects. Comments addressing the second part of the question (i.e., Are any major areas missing?) introduced topics such as mixtures, restoration, and EPA's role as a manager of sediment decontamination activities and research.

#### **Comments relating to the adequacy of CSSP approach**

As in their responses to Charge Question No. 1, many Panelists expressed the need for EPA to include a systematic process for prioritization and implementation in order to proceed from a list of science activities to an actual plan. They agreed that the risk paradigm could be applied in the management of contaminated sediments, and one Panelist remarked that risk assessment and toxicity assessment needed to be treated separately during the process. The Chair noted that the Plan alludes to a tiered framework for risk assessment. He suggested that this framework could serve as a basis for identifying critical science activities for prioritization. Dr. Hofmann agreed that a screening approach would help to classify research areas. Comments made by a member of ORD implied that the information gathered at the screening stage could be combined with readily available information to determine the level of priority for a specific science activity. He expressed that when faced with a decision, EPA must decide if an area is critical enough to merit allocating resources to reduce uncertainty in that area. In other words, resource prioritization should account for the ease with which the information for refining the risk assessment can be obtained as well as the relative need of the information.

After a lunch recess, the Panel Chair returned with a document that could potentially provide a framework for determining scientifically defensible planning. This booklet, *Toward Integrated Environmental Decision-Making* (TIEDM) (EPA-SAB-EC-00-011), pertains to risk management decisions, but the iterative process it proposes includes appropriate categories for effective development of a science plan. Dr. McFarland asked that all Panelists peruse the document before meeting on October 31. The “Six Ps” framework proposed while addressing Charge Question No. 1 may be comparable to the algorithms proposed in the TIEDM document. The Panelists explicitly stated that although they may provide examples of decision-making frameworks for EPA, the Agency is ultimately responsible for adapting and/or altering the framework to meet its specific needs.

During its discussion of Charge Question No. 2, the Panel again indicated a need for better defined communication and coordination mechanisms. One Panelist asked a representative of ORD how he obtains outside information regarding contaminated sediments. He responded that he receives input from a variety of sources, including states, regions, and the public, but these communication channels are the result of his own personal efforts and not an established process. One Panel member suggested that it would be useful to gather and aggregate the information collected through various communication activities, forums, and meetings. She proposed that a standard template could be used to record information and enter it into a computer database. Using a program such as Delphi, EPA could draw conclusions about areas of uncertainty and need without running the risk of only responding to the most vocal stakeholders. After communication procedures have been established, the end result of the information-gathering process must be conveyed in such a way that stakeholders can understand how they have impacted policy decisions, or at least recognize that their opinions have been considered.

Several Panelists raised more specific concerns on topics that the Plan did not fully address. For example, one Panel member noted that although many of the science activities proposed in the Plan would help define the unit of sediment for analysis, they do not address the question of the exposure unit necessary to create a risk of a certain magnitude. Without this information, researchers cannot define a sampling program. They must proceed from an

exposure model, decide upon an acceptable confidence level, and design sampling procedures that meet the scientific need.

Another Panel member noted that the Plan addresses ecological effects more explicitly than human health effects. Dr. Hofmann explained that many other EPA documents deal with human health effects and risk assessment, so the Plan did not address these areas in great detail. She offered that the CSSP Work Group should list these relevant documents in the Plan.

### **Comments addressing areas missing from the CSSP**

The Panel noted that in addition to those areas needing further refinement, some topics were excluded from the Plan almost entirely. The Chair conveyed the general sentiment of the Panel that the CSSP neglects several areas necessary for risk-based decision making. A transparent, systematic process must be articulated before prioritization can take place.

One Panelist claimed that the Plan neglected to address mixtures much like it failed to address human health effects. The procedures proposed in the document take a chemical-by-chemical approach, while in the field, mixtures, not individual chemicals, are encountered. The CSSP must find a way to reconcile risk assessments based on individual chemicals with the effects of mixtures found in the environment.

Another Panel member objected to a focus on remediation without a discussion of restoration. However, other Panelists agreed that because restoration is difficult to define (i.e., should a site be restored to its state before the arrival of man or before the impact of the most recent polluting activity), the Panel and the Plan should not attempt to address this issue.

Taking a step back from these specifics, several Panel members expressed that EPA should adhere to its mandate when addressing scientific problems. The Agency's motivations and rationale for conducting certain research efforts may be very different from the forces driving institutional or industrial research. One Panelist described the CSSP as a tool to

support EPA's role as regulator and manager of science activities. He believed that the Panel should consider how the Plan can best complement ongoing Agency planning and research processes. In the end, the science should support and augment EPA's management capabilities.

One Panel member offered an editorial suggestion for the CSSP. Perhaps some of the initial science background could be migrated to Chapter 2, leaving Chapter 3 to address specific science issues. Another Panelist attempted to refocus the discussion, claiming that the Panel could not possibly address all science issues in the Plan and should instead focus on articulating a process for prioritization and implementation. With such a framework in place, EPA would have the tools necessary to identify the most useful science, according to their needs and available resources.

### **7.2.2 CSSP Review Panel Responses**

#### Main points addressing the adequacy of the CSSP's treatment of science issues:

- The risk paradigm provides an appropriate starting point, but a more explicit, specific framework must be developed for prioritization and implementation.
- The Plan must include a comprehensive communication strategy, which acknowledges stakeholder input.
- The Plan should propose methods for defining certain parameters to allow for the development of appropriate sampling programs.
- The Plan should explicitly address human health effects research taking place within the Agency, instead of assuming that the audience has knowledge of these efforts.

#### Main points identifying topics missing from the CSSP:

- The Plan should include a discussion dealing with mixtures of contaminants and should address the concept of site restoration to some degree.
- EPA should be driven by its mandate when addressing the issue of contaminated sediments.
- Chapter 2 should include initial science background information; Chapter 3 should address specific science issues.

### **7.3 Developing Response to Charge Question No. 3a** (Corresponds to #6 in the transcript - Appendix I, p. I-179)

Following the discussion of Charge Question No. 2, Dr. McFarland introduced Charge Question No. 3a to the Panel:

Chapter Four provides the key recommendations for future Agency priority science activities, including research, from the identified research needs and discussion in Chapter Three. For each recommendation, critical U.S. EPA partners and the immediate or long-term nature of the science activity are proposed. Do the CSSP recommendations meet the CSSP's goals and objectives?

Before the floor was opened for general discussion by the Panel, the two Panelists who drafted a written response to Charge Question No. 3a reviewed their main points. (See Appendix G for the draft response.) The first reviewer relayed his belief that the goals in the plan should be restated and that a minimum fourth goal should be added, incorporating the Panel's remarks. In Chapter 4, he counted 33 specific recommendations: 25 supported the first goal stated in the Plan (development and dissemination of tools and science), 8 supported the second goal (enhanced coordination and communication), and none supported the third goal (development of effective, cost efficient strategy).

The reviewer urged that pursuant to Goal 1, EPA must examine if it is proposing the right activities to accomplish this goal. A framework is needed before these recommended activities can be evaluated. The proposed mechanisms to support coordination and communication under Goal 2 consist mainly of conferences and workshops. The Panelist admitted that this may be the best possible strategy for the present, until budgeting issues are addressed. Goal 3 is almost entirely unsupported, with no real recommendations except for conducting surveys and updating the plan. These activities may be the beginning of a framework. The commenter summarized by saying that as an internal document, the Plan addresses Goal 1 comprehensively, Goal 2 partially, and Goal 3 not at all.

The second Panel reviewer for Charge Question No. 3a added that the questions asked in Charge Question No. 3 may not be the most helpful or appropriate questions to pose to the Panel. Before the Panel can evaluate priorities and identify problems, a framework or process must be in place. The "cost efficient" strategy alluded to within the document must be clarified to allow the reader to discern whether cost efficient entails dollar costs, time costs, or credibility costs to EPA. Ideally, it should realize the best use of all resources.

### **7.3.1 CSSP Review Panel Discussion**

After the main reviewers concluded, the Panel Chair inquired about what resources EPA has allocated to the development of the CSSP and whether the Agency considers the science plan a priority. Dr. Hofmann responded that EPA is very serious about developing a science planning handbook and that the Panel's recommendations will be applied to a general science plan as well as the CSSP. A member from ORD clarified that the Panel should not make specific estimates of the financial resources needed to develop a plan but should offer more qualitative recommendations.

### **7.3.2 CSSP Review Panel Responses**

#### Main points made in responding to Charge Question No. 3a:

- The Plan's proposed science activities support Goal 1 relatively well.
- The Plan partially supports Goal 2 with conferences and workshops as the main communication/coordination mechanisms.
- The Plan does not include recommendations to support Goal 3.
- EPA should devote sufficient resources to the development of a solid science plan.
- The term "cost efficient" should be better defined and consistently used throughout the document.

### **7.4 Developing Response to Charge Question No. 3b**

*(Corresponds to #7 in the transcript - Appendix I, p. I-187)*

The Panel quickly moved on to Charge Question No. 3b, which Dr. McFarland introduced as:

Are the key recommendations clearly defined and appropriate to address the identified CSSP science needs, and are the priorities identified appropriate?

The Panel member who drafted a written response to this Charge Question reiterated many points that had already been made by the Panel. (See Appendix G for the draft response.) In order to address this question, he expressed that the Plan must provide a concise framework and defined priorities. The Panelist observed that it is difficult to link recommendations to science needs, and without a method for prioritization, the recommendations are virtually useless. While most recommendations seem appropriate to the subject of contaminated sediments, the Plan provides no justification for their appearance on the list of science activities. The commenter said that in some cases, it is not clear whether the listed

science activity is a genuine science need or merely reflects the desire for more information or activity in a particular area. On the whole, the Plan must adopt a more integrative approach by linking laboratory results to field application, considering multiple generations, and analyzing the effects of multiple contaminants and mixtures. While the recommendations for sediment remediation were fitting, the descriptions of stakeholder involvement and risk communication were particularly unclear.

#### **7.4.1 CSSP Review Panel Discussion**

Following this summary, Dr. McFarland opened the floor to additional comments. Points raised by the Panelists overlapped considerably with previous discussions, especially regarding the need for a prioritization process and the establishment of comprehensive communication and coordination mechanisms. Additional topics included the need to plan for the future and explicitly consider mixtures and synergistic effects.

Many Panel members reemphasized that the Plan did not delineate a process for establishing priorities. Dr. Hofmann clarified that the science activities were not ordered or categorized except into short- and long-term recommendations. A Panel member expressed the belief that a science plan should prioritize by determining which problems can best be addressed by science. The Plan cannot comprehensively address every aspect of a problem, past, present, and future; thus, a process must be in place to confront changes in the science and state of the environment.

Panelists continued to comment along the same lines, indicating that the Plan should acknowledge the future and provide recommendations on anticipated technology and science needs, as well as provide discussion on existing issues. The Plan should provide for changes in the future and allow EPA to prepare in advance. One Panel member suggested that the Contaminated Sediments Management Committee be tasked with solving the everyday problems encountered in contaminated sediments management; the Plan cannot possibly address all of the seen and unforeseen issues, but it can establish a strategy for the Management Committee.

The Panel also concluded that the Plan must not only look to the future, but it must also look outside the Agency. Communication and coordination mechanisms must be further developed and made more explicit. One Panelist suggested that the first chapter of the Plan should establish all of the affected parties and stakeholders, along with a description on how the authors obtained their information. The impetus for the science recommendations, whether it vary from stakeholder input to the availability of new technology, must be acknowledged in the Plan.

During the discussion, the Panelists also debated specific issues related to mixtures and synergistic effects. Many felt the Plan recommended research that focused on individual chemicals instead of including the types of mixtures typically encountered at contaminated sites. One Panelist noted that the document does not address synergistic effects; it seems that models rather than validated studies are used in risk assessments for mixtures. A member of ORD explained that sufficient data and information do not always exist to develop a regulatory strategy. Often, the Agency must content itself with bringing existing science into practice and making more informed decisions on pervasive, well-studied problems.

#### **7.4.2 CSSP Review Panel Responses**

##### Main points made in response to Charge Question No. 3b:

- The Plan must describe a process for prioritization.
- The Plan must elaborate on communication and coordination mechanisms and acknowledge stakeholder input.
- The Plan must look outside of the Agency and to the future.
- The Plan should consider how synergistic effects involving mixtures will be addressed.

#### **7.5 Developing Response to Charge Question No. 3c** *(Corresponds to #8 in the transcript - Appendix I, p. I-216)*

Dr. McFarland proceeded to introduce the final Charge Question, which reads:

Are the CSSP's recommendations responsive to the identified need for coordination, particularly intra-agency?

As before, the Panel member who submitted a written response to the question outlined his findings for the Panel. (See Appendix G for the draft response.) He stated that the Plan should coordinate planning within and outside of the Agency, stimulate collaborative research efforts, and provide for technology transfer and capacity building. The document did not identify the need for coordination within EPA and provides only a reference to the offices and related programs associated with each recommendation. This structure lacks the necessary process for coordination in planning, research, and outreach.

According to this primary reviewer, the process must begin with coordination of planning within EPA, including the inventory of scientific activities related to contaminated sediments. Appendix A in the CSSP provides a starting point from where EPA can proceed to identify and coordinate with other agencies involved in similar research. This research must be coordinated among EPA and outside stakeholders and include global to site-specific activities. Stakeholders, especially states, must be involved in this ongoing research, as states often invest their own resources in the management of contaminated sediments and act as a research group as well as a stakeholder.

The Panelist advised that the Plan should also include a strategy for technology transfer and capacity building. In order to justify the amount of resources devoted to research, EPA must clarify how it intends to disseminate the information it gains through science activities. The recommendations for technology transfer and capacity building must be cost effective in order to allow wide-spread application.

#### **7.5.1 CSSP Review Panel Discussion**

The Panel discussion began when one Panelist noted that communication within and across agencies could perhaps be facilitated if ORD invested resources to maintain large networks and databases to aid in the institutional decision-making process. Dr. Hofmann responded that after much effort, EPA established a database to track research efforts. This database evidences the progress that has already been made as a result of the Work Group's efforts. EPA is also attempting to increase and ease the use of internal and external websites.

Dr. Hofmann also elaborated on the Agency's efforts to involve stakeholders in the development of the Plan. Regarding the states, EPA offices have mechanisms such as Federal Register notices and mailings, which allow them to share materials. Within the Agency, several work groups exist, and several annual meetings occur between different groups. The internal EPA website is also informative and helpful in sharing information.

A Panel member responded by noting that coordination with states still seems to take on a scattered approach. Coordination with these stakeholders should involve their participation in the development of the plan. Another Panelist suggested consulting with business schools to determine how companies share information. Perhaps EPA should make decisions using a more businesslike strategy.

The Panel requested that ORD elaborate upon how the CSSP will aid coordination efforts. A representative from ORD explained that the Plan would provide valuable information about contaminated sediments activities in all regions. The document should collate and communicate all related activities and stakeholders so all parties have the same level of understanding of the problem at hand. ORD's planning process involves representatives and work groups from all levels that provide input to determine needs and allocate resources for research. The Plan would help guide the direction of these resources as an ORD planning tool and ensure that redundant research efforts do not occur.

## **7.5.2 CSSP Review Panel Responses**

### Main points made in addressing Charge Question No. 3c:

- The Plan should identify the need for coordination within the Agency, and should establish procedures for interagency cooperation.
- The Plan should include mechanisms for research and planning coordination, as well as technology transfer and capacity building.
- EPA should consider investing resources in a database to coordinate science activities and research.
- States should be viewed as integral stakeholders and research groups; EPA should invite states to participate in the development of a plan.
- The CSSP should be used to aid ORD's planning process to ensure efficient use of resources.
- The plan development process must begin with a comprehensive literature review.

## 7.6

### **Summary of Panel Responses to Charge Questions**

*(Corresponds to #9 of the transcript - Appendix I, p. I-242)*

After the Panel concluded their discussion of Charge Question No. 3c, they regrouped to consider their responses to all the Charge Questions and to gather additional information from the Work Group. Dr. Hofmann explained that the Plan was intended to assemble information related to contaminated sediments and relate this information across the Agency. Beyond that, the Plan should help identify problems and needs to aid planning efforts in offices such as ORD. Resources should be directed in a cost efficient manner and prevent duplicate research efforts. The next step will be to establish an implementation strategy, which may be delegated to the Contaminated Sediments Management Committee. Dr. Hofmann requested that the Panel provide suggestions and feedback on the topics identified in the Charge Questions. They should focus on the larger issues that have been raised as a result of this effort to develop the CSSP.

The Panel agreed that the CSSP did not represent their vision of a science plan. Dr. Hofmann emphasized, however, that the CSSP goes beyond a literature review or science survey, noting that the Work Group attempted to look to the future and anticipate upcoming science needs. The CSSP is a work in progress and hopefully the first step toward a veritable science plan.

The Panel expressed that it does not intend for the Work Group to completely revise the CSSP, but several areas of the Plan should be modified. The written comments to the Charge Questions should be considered and incorporated into the Plan, if possible. In addition, the title of the Plan and Chapter 2 should be changed to more accurately reflect their content. Chapter 2 should also state the rationale for the inclusion of the identified science activities. The Panel proposed the establishment of a systematic coordination/communication plan as well. Dr. Hofmann noted that Goal 3 of the CSSP would be better addressed in an implementation plan. One Panelist suggested that the Work Group not spend an excessive amount of time revising the document but instead focus on progressing from an outline of activities to a synthesis that will

eventually lead to a science plan. After this process takes place, EPA can begin to consider resource allocation and cost efficiency through a prioritization scheme.

As the CSSP revision process takes place, the Panel suggested that the Work Group explicitly consider future planning efforts and paradigm. They should examine models, such as those in the TIEDM manual and the “Six Ps,” that could potentially serve as algorithms for how priority setting should proceed.

## **8.0**

### **SUMMARY OF CSSP REVIEW PANEL RECOMMENDATIONS**

At the end of the first day (#10 of the transcript) and throughout the second day (#11-13 of the transcript), the Panel deliberated over the topics that had been raised during the discussion of the Charge Questions. When the meeting was adjourned on October 31, the Panel had come to a consensus on a variety of issues regarding the CSSP itself and the characteristics of an ideal science plan. This consensus is summarized by a draft document produced by the Panel, unofficially titled “CSSP Review Panel Summary of Recommendations,” which is located in Appendix H.

The Panel engaged in considerable discussion before arriving at this consensus. The main topics of this discussion and various points made by individual Panel members are summarized in Table 8.1. The comments within each topic are presented in the order in which they were made and contain references to commenter and the section of transcript. The Panel did not agree on each expressed opinion, but the discussion of these matters was integral to arriving at a consensus by the meeting’s conclusion.

**Table 8.1**  
**Summary of Topics Discussed in Reaching a Panel Consensus**

Topic	Comment ( <i>attribution, section in transcript</i> )
Communication and Coordination	<ul style="list-style-type: none"> <li>• EPA should use the compilation of activities to promote communication and coordination of Agency offices and regions. (<i>Panel consensus, 11</i>)</li> <li>• EPA should Establish science priorities by examining activities outside of the Agency. (<i>Panel consensus, 11</i>)</li> <li>• The Work Group has sought advice from the public and other agencies, but comments have not yet been incorporated into the Plan, as they have been received simultaneously with the Panel’s review. (<i>Work Group Chair, 11</i>)</li> <li>• EPA should use their resources to coordinate research efforts outside of the Agency. (<i>Panel member, 11</i>)</li> <li>• The Plan should codify a process for examining related activities conducted outside EPA. (<i>Panel member, 11</i>)</li> <li>• The Plan’s appendix should include science activities outside EPA. (<i>Panel member, 11</i>)</li> <li>• In order for EPA to collaborate with other agencies, they must first identify ongoing activities internal to the Agency before they can compare with other agencies and set priorities. (<i>Panel member, 11</i>)</li> <li>• EPA should consider science activities and results from other agencies in a systematic way. (<i>Panel consensus, 11</i>)</li> <li>• The Plan should be more clear and consistent in its specification of a lead office for each science activity. (<i>Panel member, 12</i>)</li> <li>• EPA should consider the concept of partnering as it establishes techniques for accomplishing research activities. (<i>Panel member, 12</i>)</li> <li>• The Plan should elaborate on target users within the agency, states, regions, institutions, and industry. (<i>Panel member, 12</i>)</li> </ul>
Consideration of Future	<ul style="list-style-type: none"> <li>• The future of the science of contaminated sediments should be addressed by the Plan. (<i>Panel member, 11</i>)</li> </ul>
Data Quality	<ul style="list-style-type: none"> <li>• It is difficult to determine how the Plan should articulate issues of data quality. (<i>Panel member, 11</i>)</li> <li>• There should be a process in place to ensure the quality of the data, which will be used as an input to modeling. (<i>Panel member, 11</i>)</li> <li>• The issue of data quality pertains to research and not a general science plan. Other Agency documents describe proper data quality procedures. (<i>SAB staff director, 11</i>)</li> <li>• The Plan’s emphasis on sediment stability did not go far enough to consider stability in terms of exposure. Discussions of the complicated interactions affecting sediment stability warrant further detail. (<i>Panel member, 12</i>)</li> </ul>

**Table 8.1 (Continued)**

Topic	Comment <i>(attribution, section in transcript)</i>
EPA Mandate and Legislative Background	<ul style="list-style-type: none"> <li>• EPA should focus on research activities that allow it to meet its mandate. <i>(Panel member, 10)</i></li> <li>• The Panel should not make recommendations that restrict the Work Group; it should allow the Plan to evolve to best meet EPA's mandate. <i>(Panel member, 11)</i></li> <li>• The Plan should explicitly state the legislative background and mandate for such a plan. <i>(Panel member, 11)</i></li> <li>• Chapter 2 should incorporate more activities that support the regulations driving the Plan. <i>(Panel member, 11)</i></li> <li>• Applicable regulations should be collated and summarized in an appendix. <i>(Panel member, 10)</i></li> </ul>
General Science Plan	<ul style="list-style-type: none"> <li>• EPA should work to adopt a science plan paradigm for the entire Agency. <i>(Panel consensus, 11)</i></li> <li>• The CSSP is not an appropriate model for a general science plan, but it can serve as a basis for further discussion of a general plan. <i>(Panel consensus, 11)</i></li> <li>• A collaborative science plan could increase efficiency and conserve financial resources, both internally and externally to EPA. <i>(Panel member, 11)</i></li> <li>• The CSSP should be revised, incorporating the more minor Panel comments, and then be used as a point of departure for developing a general science plan. <i>(Panel member, 12)</i></li> <li>• Future plans should establish priorities relevant to the available resources. <i>(Panel member, 12)</i></li> </ul>
Infrastructure	<ul style="list-style-type: none"> <li>• EPA should devote more resources to science planning infrastructure, such as a database of research activities. <i>(Panel member, 10)</i></li> <li>• Future database development should include research results within and outside of EPA. <i>(Panel member, 11)</i></li> </ul>
Intent of the CSSP	<ul style="list-style-type: none"> <li>• The CSSP is merely a synthesis of the state of current science and lacks a planning element. <i>(Panel member, 11)</i></li> <li>• The Panel should consider the intended use of the document, which is to aid Agency managers in allocating resources. <i>(SAB staff director, 11)</i></li> <li>• The intent differs from the document's stated goals; therefore, the goals must be reconciled with what is actually communicated in the plan. <i>(Panel Chair, 11)</i></li> <li>• The Plan's intentions go beyond what the Plan actually can accomplish. <i>(Panel consensus, 12)</i></li> </ul>
Leadership	<ul style="list-style-type: none"> <li>• EPA should establish a leadership position to oversee scientific issues. <i>(Panel member, 10)</i></li> <li>• The Contaminated Sediments Management Committee would ultimately decide which office would take the lead on the various science activities. <i>(Work Group Chair, 12)</i></li> </ul>

**Table 8.1 (Continued)**

Topic	Comment ( <i>attribution, section in transcript</i> )
Naming Conventions	<ul style="list-style-type: none"> <li>• The Plan should be renamed using terms such as Inventory, Synthesis, Activities, or Needs. (<i>Panel consensus, 10</i>)</li> <li>• The Panel should offer suggestions, not prescriptions, for a new name for the Plan. The title could include, “Science synopsis: foundation for a science plan” or “a foundation for planning.” (<i>Panel discussion, 11&amp;12</i>)</li> <li>• Chapter 2 should be renamed, “Overview of Major Sediment Issues and Needs Across the Agency.” (<i>Panel member, 11&amp;12</i>)</li> </ul>
Need for Plan	<ul style="list-style-type: none"> <li>• Although a comprehensive sediment plan is obviously needed, the Plan does not provide sufficient evidence to demonstrate its need. (<i>Panel member, 11</i>)</li> </ul>
Prioritization	<ul style="list-style-type: none"> <li>• The Plan only prioritizes based on the short and long term, and the Plan must go further to stipulate a process for prioritization. (<i>Panel member, 11</i>)</li> <li>• The Plan should articulate where priority determinations were based on regulatory or stakeholder needs. (<i>Panel member, 11</i>)</li> <li>• The prioritization scheme should be informed by outside science. ORD is aware of ongoing science activities outside of EPA, but they did not explicitly state this in the Plan. (<i>ORD representative, 11</i>)</li> </ul>
Process	<ul style="list-style-type: none"> <li>• The planning process should include the compilation of critical science needs across the agency in support of defensible, science-based decisions. (<i>Panel consensus, 11</i>)</li> <li>• Chapter 1 or 2 of the CSSP should establish the importance of the process for adopting a coherent plan. (<i>Panel member, 11</i>)</li> <li>• A systematic process should be developed for application to future plans. The “Six Ps” and the TIEDM manual can serve as references. (<i>Panel consensus, 11&amp;12</i>)</li> <li>• The Agency must ultimately decide on the structure of the process; the SAB can only offer suggestions. (<i>Panel member, 11</i>)</li> <li>• The risk-based paradigm provides a solid underpinning for a process. (<i>Panel consensus, 11</i>)</li> </ul>
Rationale	<ul style="list-style-type: none"> <li>• A statement of rationale should be incorporated for each recommendation presented in the Plan. (<i>Panel member, 11&amp;12</i>)</li> <li>• The Plan should distinguish between those recommendations motivated by regulatory drivers and those originating from stakeholder input. (<i>Panel member, 11&amp;12</i>)</li> <li>• The Plan should describe more than the general atmosphere in which it will be implemented; the criteria for prioritization and process for developing recommendations should be explicitly stated. (<i>Panel member, 11</i>)</li> <li>• The document should contain more supporting references. (<i>Panel member, 12</i>)</li> </ul>

**Table 8.1 (Continued)**

Topic	Comment <i>(attribution, section in transcript)</i>
Resource Allocation	<ul style="list-style-type: none"> <li>• The Panel should not advise on the quantitative level of funding that should be devoted to development and implementation of a science plan; however, the level of resource allocation reflects the Agency's commitment to the development of a quality, scientifically-defensible plan. <i>(Panel consensus, 10)</i></li> <li>• Funding for the development of a science plan should be expanded to the fullest extent. <i>(Panel member, 10)</i></li> <li>• EPA should allocate sufficient resources for both planning and execution of science activities. <i>(Panel member, 11)</i></li> <li>• The Plan must consider the resource requirements needed to implement the recommended science activities, including funding, man power, and time. <i>(Panel member, 11)</i></li> <li>• EPA should consider resource limitations as it finalizes the plan. <i>(Panel member, 11)</i></li> <li>• Because the Plan will be finalized before funding is considered, the Plan should be optimistic and not limit its recommendations due to perceived resource shortages. <i>(Panel member, 11)</i></li> <li>• The Plan should identifying areas which lack resources, in order to aid in prioritization. <i>(Panel member, 11)</i></li> <li>• EPA could stage research activities to take advantage of additional resources as they become available. <i>(Panel member, 11)</i></li> </ul>
Schedule for Revisiting the CSSP	<ul style="list-style-type: none"> <li>• A five year cycle is too infrequent to revisit the Plan. <i>(Panel consensus, 11)</i></li> <li>• Perhaps the Plan should be revised every three years, in conformity with the Agency's multi-year plans. <i>(Panel member, 11)</i></li> <li>• Flexibility should be built into the Plan in the event of a major science or technology breakthrough. <i>(Panel member, 11)</i></li> <li>• There are different levels of revising and revisiting. While the Plan has stipulated a longer time frame to reconsider the Plan as a whole, smaller revisions occur on a more frequent basis. <i>(ORD representative, 11)</i></li> <li>• The Contaminated Sediments Management Committee will oversee implementation and could also supervise the incorporation of emerging science into the Plan. <i>(Work Group Chair, 11)</i></li> <li>• The Plan establishes review on an annual basis. <i>(Panel member, 11)</i></li> <li>• The Contaminated Sediments Management Committee meets quarterly, so they will have the opportunity to examine the plan annually and conduct an intensive reevaluation every three years. <i>(Panel Chair, 11)</i></li> <li>• If the Plan must be completely revised every three years, then it is not a valid plan. <i>(Panel member, 11)</i></li> <li>• The Panel may not want to recommend a specific time period for review, as it interferes with EPA's managerial role. <i>(SAB staff director, 11)</i></li> <li>• Whatever the cycle of revision, the Plan should structure the review process in a more obvious way and attempt to expedite the review process. <i>(Panel member, 11)</i></li> </ul>

**Table 8.1 (Continued)**

Topic	Comment <i>(attribution, section in transcript)</i>
Schedule for Revisiting the CSSP (Continued)	<ul style="list-style-type: none"> <li>• If the plan focused more on the process rather than specific science activities, then it would not be subject to frequent revisions. Instead, other mechanisms for establishing research priorities would be instituted by the Plan itself. <i>(Panel member, 11)</i></li> <li>• The Agency should tie the review timing to certain parameters, i.e., scientific breakthroughs. <i>(Panel member, 12)</i></li> </ul>
Science Planning Handbook	<ul style="list-style-type: none"> <li>• The suggestions of the Panel regarding process will be considered during the development of the Handbook. <i>(SAB staff director, 11)</i></li> <li>• The Panel should not specifically mention the Handbook in its recommendations. <i>(Work Group Chair, 11)</i></li> <li>• The Plan should explicitly state that the Agency is concurrently developing the Handbook.</li> </ul>
Structure of Panel Response	<ul style="list-style-type: none"> <li>• The paper documenting the Panel's response should be short. <i>(Panel member, 10&amp;13)</i></li> <li>• The Panel should modify their written responses to incorporate new information gained from Dr. Hofmann and ORD staff. <i>(Panel Chair, 10)</i></li> <li>• A teleconference will be held to discuss the Panel's response on November 22. <i>(Panel Chair, 11)</i></li> <li>• Written responses to Charge Questions by Panel members should be accompanied by the caveat that they were not fully discussed by the Panel and, therefore, do not represent a consensus. <i>(Panel member, 12)</i></li> <li>• The Panel should not consider public comments, as it is outside of their charge. <i>(Work Group Chair, 12)</i></li> <li>• The Chair should qualify all Panel recommendations by providing the context in which they were offered. <i>(Panel member, 12)</i></li> </ul>
Technology Transfer and Outreach	<ul style="list-style-type: none"> <li>• In technology transfer, EPA should consider cost-effective tools that are affordable enough to be shared. <i>(Panel member, 11)</i></li> <li>• EPA does have procedures for technology transfer; the Panel can provide recommendations on dissemination tools, however. <i>(SAB staff director)</i></li> <li>• The outreach process should be circular and dynamic, incorporating the dissemination of information and input from stakeholders. <i>(Panel discussion, 11)</i></li> <li>• The Plan should include a systematic approach for input and dissemination of information. <i>(Panel member, 11&amp;12)</i></li> <li>• EPA should consider using another term besides "dissemination" to describe the process of sharing and receiving information. <i>(Panel discussion, 11)</i></li> <li>• The evaluation of the use of technology transfer and outreach tools should be inputted into the planning and implementation of science activities. <i>(Panel member, 11)</i></li> </ul>

## 9.0

### **CLOSING REMARKS**

*(Corresponds to #13 in the transcript - Appendix I, p. I-475)*

Dr. McFarland wrapped up the meeting by confirming that the draft Panel consensus was complete and accurate (see Appendix G). He noted that although the Panel's charged involved responding to the specified Charge Questions, their recommendations go beyond the scope of the questions to address issues of process and prioritization. A Panel member clarified that the official Panel response would include appendices, their responses to the Charge Questions, and recommendations for revising the CSSP and for drafting future science plans.

The Panelists thanked members of various EPA offices for providing input and information, which allowed them to better understand the perspective and assumptions of the CSSP Work Group. They especially thanked Dr. Hofmann for respectfully considering their comments. Dr. Hofmann reciprocated by thanking the Panel for their interest and commitment to the project. She expressed that the comments they provided will be very helpful to the Agency.

Dr. McFarland promised that a summary document would be produced shortly, and Mr. Martin officially adjourned the meeting.

## **Appendix A:**

### **AGENDA**

**U.S. Environmental Protection Agency  
Science Advisory Board  
Contaminated Sediments Science Plan (CSSP) Review Panel  
Ariel Rios North, Room 6013<sup>1</sup>  
1200 Pennsylvania Ave, Washington D.C.**

**Wednesday, October 30, 2002**

1. 8:30 AM Welcome and opening remarks by SAB Staff Office Director (Dr. Vanessa Vu), Designated Federal Officer (Mr. Lawrence Martin), and Panel Chair (Dr. Mike McFarland)
2. 8:40 Introduction of CSSP Panel Review Members
3. 9:00 EPA CSSP Work Group Introductory Remarks by representative of EPA Science Policy Council (Mr. Michael Shapiro); Briefing (Dr. Lee Hofmann)  
  
10:00  
BREAK
4. 10:15 Public Comment Period (Dr. Robert Engler, U.S. Army Corps of Engineers)
5. 10:30 Developing Responses to EPA Charge to the SAB CSSP Review Panel:  
  
1) The Contaminated Sediments Science Plan (CSSP) is the first official Agency science plan of its kind designed to address a significant cross-agency environmental issue in a systematic and integrated fashion. Chapter One of the CSSP discusses the goals, objectives, and how the CSSP relates to the Agency's mandate. Are the goals and objectives of the plan understandable and appropriate to the subject, and does the CSSP adequately convey the need for such a planning document?  
2) Chapter Two of the CSSP provides an overview of the contaminated sediment problems and issues across the Agency. The brief description of issues in Chapter Two is meant to provide the overall context for the more detailed discussion of specific science needs given in Chapter Three. Are the major areas of contaminated sediments science identified in Chapters Two and Three (sediment site characterization, exposure assessment, human health effects and risk assessment, ecological effects and risk assessment, sediment remediation, baseline and post-remediation monitoring, risk communication, and information management and exchange activities) addressed adequately? Are any major areas missing?  
3a) Chapter Four provides the key recommendations for future Agency priority

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<sup>1</sup> Ariel Rios is a secured Federal building. You must show identification and be escorted to the meeting room. If you are arriving by the Metro, take the Blue/Orange line to the Federal Center. Upon leaving the metro station (at the top of the escalator) you will be facing a plaza between the Reagan and Ariel Rios Buildings, walk around to your right and enter the door immediately on your left. This is the main entrance to Ariel Rios North.

science activities, including research, from the identified research needs and discussion in Chapter Three. For each recommendation, critical U.S. EPA partners and the immediate or long-term nature of the science activity are proposed. Do the CSSP recommendations meet the CSSP's goals and objectives?

**3b)**

Are the key recommendations clearly defined and appropriate to address the identified CSSP science needs, and are the priorities identified appropriate?

**3c)**

Are the CSSP's recommendations responsive to the identified need for coordination, particularly intra-agency?

12:30 PM

LUNCH

6. 2:00Continued Development of Responses to EPA Charge to the SAB CSSP Review Panel

3:30

BREAK

7. 3:50Continued Development of Responses to EPA Charge to the SAB CSSP Review Panel

8. 5:00Summary of points of consensus/nonconsensus and schedule for following day's activities (Dr. Mike McFarland)

9. 5:30ADJOURN (Time Approximate)

**Thursday, October 31, 2002**

The day's work will largely be devoted to drafting the Panel's report to the SAB Executive Committee.

1. 8:00 AM  
Committee discussion of non-consensus positions & redrafting of positions

10:30

BREAK

2. 10:45  
Summary of principal findings of CSSP Review Panel & Panel discussion (Dr. Mike McFarland)

11:30

LUNCH

3. 1:00 PM  
Resolution of outstanding issues, redrafting  
  
3:00  
BREAK
4. 3:20  
Final revisions and submission of draft Panel responses of Charge Questions (electronic and hardcopies) to DFO (Mr. Lawrence Martin); assignments for final draft as necessary
5. 5:00  
ADJOURN (Time Approximate)

NOTE: A Future Teleconference Meeting is planned for November 22, from 2-4pm Eastern Time, to finalize the draft Panel report. The Panel may also determine that additional conference calls are required to complete the Panel's report. Those will be scheduled and announced in the Federal Register as necessary.

**Appendix B**

**FEDERAL REGISTER NOTICE OF MEETING**

# EPA Science Advisory Board, Notification of Public Advisory Committee Meetings of the Contaminated Sediment Science Plan Review Panel; and Notification of Cancelled Meetings of the Human Health Research Strategy Review Panel

[Federal Register: October 1, 2002 (Volume 67, Number 190)]  
[Notices] [Page 61622-61624] From the Federal Register Online via  
GPO Access [wais.access.gpo.gov] [DOCID:fr01oc02-73]

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## ENVIRONMENTAL PROTECTION AGENCY

[FRL-7387-7]

EPA Science Advisory Board, Notification of Public Advisory  
Committee Meetings of the Contaminated Sediment Science Plan Review  
Panel; and Notification of Cancelled Meetings of the Human Health  
Research Strategy Review Panel

Pursuant to the Federal Advisory Committee Act, Public Law 92-463,  
notice is hereby given of three meetings of the Contaminated Sediment  
Science Plan Review Panel (CSSP Review Panel) of the U.S. Environmental  
Protection Agency's (EPA) Science Advisory Board (SAB). The Panel will  
meet on the dates and times noted below. All times noted are Eastern  
Time. All meetings are open to the public, however, seating is limited  
and available on a first come basis. For teleconference meetings,  
available lines may also be limited.

Important Notice: The document that is the subject of this SAB  
review, Contaminated Sediment Science Plan, June 13, 2002 draft, is  
available on the SAB Web site at <http://www.epa.gov/sab/panels/cssprpanel.html>.  
Any questions concerning the draft document should be  
directed to the program contact noted below.

Background--The background for this review and the charge to the  
panel were published in the 67 FR 49336, July 30, 2002. The notice also

included a draft charge to the panel, a call for nominations for members of the panel in certain technical expertise areas needed to address the charge and described the process to be used in forming the panel.

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#### 1. Contaminated Sediment Science Plan Review Panel--October 17, 2002 Teleconference

The CSSP Review Panel will meet on October 17, 2002 via teleconference from 2:00 pm to 4:00 pm Eastern Time. This teleconference meeting will be hosted out of Conference Room 6013, USEPA, Ariel Rios Building North, 1200 Pennsylvania Avenue, NW, Washington, DC 20004. The meeting is open to the public, but, due to limited space, seating will be on a first-come basis. The public may also attend via telephone, however, lines may be limited. For further information concerning the meeting or how to obtain the phone number, please contact Mr. Lawrence Martin, Designated Federal Officer, contact information indicated in this FR notice.

Purpose of the Meeting--The purpose of this public teleconference meeting is to: (a) Discuss the charge and the adequacy of the review materials; (b) to discuss specific charge assignments to the CSSP Review Panelists; and (c) to clarify specific points of interest raised by the Panelists in preparation for the face-to-face meeting to be held on October 30-31, 2002.

See below for availability of review materials, the charge to the review panel, and contact information.

#### 2. Contaminated Sediment Science Plan Review Panel--October 30-31, 2002 Meeting

The CSSP Review Panel of the Science Advisory Board (SAB) will conduct a public meeting on October 30-31, 2002. The meeting will begin

on October 30 at 8:30 am and adjourn no later than 5:30 pm that day. On October 31, 2002, the meeting may begin at 8 am and adjourn no later than 5 pm. The meeting will take place at the SAB Conference Room 6013, USEPA, Ariel Rios Building North, 1200 Pennsylvania Avenue, NW, Washington, DC 20004. The meeting is open to the public, with the same provisions identified above in #1.

Purpose of the Meeting--The purpose of this meeting is to conduct a review of an Agency draft document entitled, Contaminated Sediment Science Plan, June 13, 2002 draft, prepared by the U.S. Environmental Protection Agency. In particular, the Review Panel will: (a) Engage in dialogue with appropriate officials from the Agency who are responsible for the Plan's preparation; (b) discuss panelist's written responses to elements addressed by the charge questions; (c) receive public comments as appropriate; and (d) assemble and revise written drafts to complete a rough draft written review of the Plan.

See below for availability of review materials, the charge to the review panel, and contact information for both meetings.

### 3. Contaminated Sediment Science Plan Review Panel--November 22, 2002 Teleconference

The CSSP Review Panel will meet on November 22, 2002 via teleconference from 3:00 pm to 5:00 pm Eastern Time. This teleconference meeting will be hosted out of Conference Room 6013, USEPA, Ariel Rios Building North, 1200 Pennsylvania Avenue, NW, Washington, DC 20004. The meeting is open to the public, with the same provisions identified above in #1.

Purpose of the Meeting--The purpose of this public teleconference meeting is to: (a) Discuss drafts of sections of the Panel Report; (b) recommend revisions to the Panel Report; and (c) clarify specific points of concern for further discussion and resolution.

The need for subsequent meetings of the Review Panel will be discussed at this meeting and schedules of any future meetings to complete review of this topic will be determined. Information

concerning any future public meetings will appear in Federal Register notices as appropriate.

Charge to the CSSP Review Panel--The background to the charge and the charge questions are located on the SAB website at:

<http://www.epa.gov/sab/panels/cssprpanel.html>.

FOR FURTHER INFORMATION: To inquire about public participation in the meetings identified above please contact Mr. Lawrence Martin, Designated Federal Officer, CSSP Review Panel, USEPA Science Advisory Board (1400A), Suite 6450R, 1200 Pennsylvania Avenue, NW, Washington, DC 20460; telephone/voice mail at (202) 564-6497; fax at (202) 501-0323; or via e-mail at [martin.lawrence@epa.gov](mailto:martin.lawrence@epa.gov). Requests for oral comments must be in writing (e-mail, fax or mail) and received by Mr. Martin no later than noon Eastern Time on the following dates: for the October 17 teleconference call, requests must be received by October 12; for the October 30-31 face to face meeting, requests must be received by October 25, 2002; and for the November 22 teleconference, requests must be received by November 15, 2002.

The SAB will have a brief period (no more than 10 minutes) available during the Teleconference meeting for applicable public comment. For the Teleconference, the oral public comment period will be divided among the speakers who register. At the October 30-31 face to face meeting, the oral public comment will be limited to 120 minutes divided among the speakers who register. Registration is on a first come basis. Speakers who have been granted time on the agenda may not yield their time to other speakers. Those wishing to speak but who are unable to register in time may provide their comments in writing. Members of the public desiring additional information about the meeting locations or the call-in number for the teleconference, must contact Mr. Martin at the addresses and numbers identified above.

A copy of the draft agenda for each meeting will be posted on the SAB Web site <http://www.epa.gov/sab> (under the AGENDAS subheading) approximately 10 days before that meeting.

Availability of Review Material--There is one primary document that

is the subject of the review. The review document is available electronically at the following site <http://www.epa.gov/sab/panels/cssprpanel.html>. For questions and information pertaining to the review document, please contact Dr. Lee Hofmann Office of Solid Waste and Emergency Response, Mail Code 5103T, U.S. Environmental Protection Agency, 1200 Pennsylvania Ave, NW, Washington, DC 20460 at telephone number 202-566-1928, or by e-mail at [hofmann.lee@epa.gov](mailto:hofmann.lee@epa.gov).

### Providing Oral or Written Comments at SAB Meetings

It is the policy of the EPA Science Advisory Board to accept written public comments of any length, and to accommodate oral public comments whenever possible. The EPA Science Advisory Board expects that public statements presented at its meetings will not be repetitive of previously submitted oral or written statements.

**Oral Comments:** In general, each individual or group requesting an oral presentation at a face-to-face meeting will be limited to a total time of ten minutes (unless otherwise indicated above). For teleconference meetings, opportunities for oral comment will usually be limited to no more than three minutes per speaker and no more than fifteen minutes total (unless otherwise indicated above). Deadlines for getting on the public speaker list for a meeting are given above. Speakers should bring at least 35 copies of their comments and presentation slides for distribution to the reviewers and public at the meeting.

**Written Comments:** Although the SAB accepts written comments until the date of the meeting (unless otherwise stated), written comments should be received in the SAB Staff Office at least one week prior to the meeting date so that the

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comments may be made available to the review panel for their consideration. Comments should be supplied to the appropriate DFO at

the address/contact information noted above in the following formats:

One hard copy with original signature, and one electronic copy via e-mail (acceptable file format: Adobe Acrobat, WordPerfect, Word, or Rich Text files (in IBM-PC/Windows 95/98 format). Those providing written comments and who attend the meeting are also asked to bring 35 copies of their comments for public distribution.

General Information--Additional information concerning the EPA Science Advisory Board, its structure, function, and composition, may be found on the SAB Web site (<http://www.epa.gov/sab>) and in the Science Advisory Board FY2001 Annual Staff Report which is available from the SAB Publications Staff at (202) 564-4533 or via fax at (202) 501-0256.

Meeting Access--Individuals requiring special accommodation at this meeting, including wheelchair access to the conference room, should contact Mr. Martin at least five business days prior to the meeting so that appropriate arrangements can be made.

#### Human Health Research Strategy Review Panel--Meeting Cancellation

The Agency's Science Advisory Board (SAB) announced on June 19, 2002 (67 FR 41718-41721) that it was initiating the panel formation process for the review of the Environmental Protection Agency's Human Health Research Strategy. At that time, the SAB also solicited nominations for members of the expert panel that would be established to review the research strategy. The SAB also announced on September 12, 2002 (67 FR 57814-57815), its intention to hold two meetings to conduct this review. The dates identified for the meetings were September 30, 2002 and October 7-9, 2002. Today the SAB is notifying the public that the panel meetings will not be held on these dates and that they will be scheduled for a later time. Unexpected difficulties in scheduling the meeting have caused this delay. A future Federal Register notice will provide information on when these meetings will be rescheduled. For further information, please contact Dr. Suhair Shallal, Designated Federal Officer, by email at [shallal.suhair@epa.gov](mailto:shallal.suhair@epa.gov),

or by telephone at (202) 564-4566.

Dated: September 25, 2002.

Vanessa Vu,

Director, , EPA Science Advisory Board Staff Office.

[FR Doc. 02-24915 Filed 9-30-02; 8:45 am]

BILLING CODE 6560-50-P

**Appendix C:**  
**PANEL BIOGRAPHIES**

**U.S. Environmental Protection Agency Science Advisory Board  
Executive Committee Panel on the Contaminated Sediments Science Plan  
Roster**

**Steve Bay**

**Southern California Coastal Water Research Project**

Steve Bay is Director of the Toxicology Department at the Southern California Coastal Water Research Project where his primary research focus is the relationship between sediment contamination and biological effects. His current research includes projects to assess and improve the performance of sediment Toxicity Identification Evaluation (TIE) methods and to use TIE methods in TMDL development in southern California bays and estuaries. Mr. Bay works closely with California environmental management agencies to develop methods for sediment quality assessment. Current activities in this area include a five-year project to develop sediment quality objectives for the California Water Resources Control Board and a multi-year effort to assist the San Diego Regional Water Quality Control Board in developing guidelines for sediment quality assessment and cleanup in San Diego Bay. As Special Studies Manager for the Los Angeles Basin Contaminated Sediments Task Force, Mr. Bay is coordinating several multi-year research projects related to the disposal and effects of contaminated dredge material and is also assisting state and federal agencies in developing a long-term strategy for the management of contaminated sediments in southern California. His research has contributed to the development and review of marine toxicity test methods for California regulatory programs, and standardization of west coast effluent test methods for the U.S. EPA. He participated in the Pellston workshops on porewater toxicity method and the use of sediment quality guidelines. Mr. Bay helped found the Southern California Toxicity Assessment Group, a professional organization dedicated to improving the use of toxicity tests. Mr. Bay's experience and training includes invertebrate taxonomy, field biology, animal culture, physiology, and radioisotope techniques. He received his M.S. in Biology from California State University in 1982.

**Bohlen, Frank**

**University of Connecticut**

W. FRANK BOHLEN is a professor with the Department of Marine Sciences at the University of Connecticut, Groton. His research has largely been applied coastal and stream processes studies examining factors such as sedimentary processes, sediment settling velocities, sediment transport systems, analysis of sediment transport systems and the relationship to PCB transfers, the effects of storms on sediment resuspension, time series observations of near-bottom suspended material concentrations, the impact of dredging on suspended material transport, and sediment capping of subaqueous dredged material disposal mounds. Dr. Bohlen was a member of the NAS/NRC Committee on Contaminated Marine Sediments, 1993-1998 and the Committee on Assessment of Risks from Remediation of PCB-Contaminated Sediments, 1999- 2001. Dr. Bohlen is a member of the American Geophysical Union, Estuarine Research Federation, The Oceanography Society, and Marine Technology Society. He received his Ph.D. in 1969 from the Massachusetts Institute of Technology and Woods Hole Oceanographic Institution.

**Chess, Caron****Rutgers University**

Caron Chess is an Associate Professor, Department of Human Ecology, Rutgers University and Director of the Center for Environmental Communication. She was previously the Founding Executive Director and later National Project Coordinator for the Delaware Valley Toxics Coalition (1981-1984). She has written extensively on topics of Risk Communication and Improving Public Participation in Solving Environmental Health Problems. She co-authored the publication *Improving Dialogue: The Industry Risk Communication Manual*, which was selected by the Society for Risk Analysis for the "Must Read" list for industry practitioners (1995). Dr. Chess was a member of the nominations committee for the Society for Risk Analysis (2001); member of the Communications Subcommittee of the Board of Scientific Counselors of the EPA, Office of Research and Development (2001); Invited participant, Workshop on Public Participation and Environmental Decision Making, National Research Council (2001); is a member of the Advisory Committee to Council of Society for Risk Analysis; was Panel Leader for Risk Communication at the World Health Organization International Seminar and Working Group Meeting on EMF, Risk Perception and Communication (1998); Chair for risk communication, Panel on Methyl Parathion, Agency for Toxic Substances and Disease Registry (1997); member, Committee on Risk Characterization, National Research Council (1994-1996); member, Governing Council, Society for Risk Analysis (1994-1996); member, EPA Science Advisory Board, Subcommittee on Valuation (1996-1997); and a member of the Editorial Boards of *Human Ecology Review* and *Risk Analysis: An International Journal*. Dr. Chess received her Ph.D. in Environmental Studies and Democratic Processes from State University of New York, College of Environmental Science and Forestry in 1997.

**Cory-Slechta, Deborah****University of Rochester Medical School**

Deborah Cory-Slechta began working as a junior staff fellow of the National Center for Toxicological Research beginning in 1979. She was appointed to the faculty of the University of Rochester Medical School in 1982 and rose through the ranks. In 1998, she was appointed Chair of the Department of Environmental Medicine and Director of the NIEHS Environmental Health Sciences Center at the University of Rochester. From July 2000- July 2002, she was appointed Dean for Research and Director of the Aab Institute for Biomedical Sciences, a newly established post at the University and as such, became the first female dean in the history of the Medical School. Dr. Cory-Slechta has served on numerous national research review and advisory Panels, including committees of the National Institutes of Health, the National Institute of Environmental Health Sciences, the Food and Drug Administration, the National Center for Toxicological Research, the Environmental Protection Agency, the National Academy of Sciences, the Institute of Medicine, and the Agency for Toxic Substances and Disease Registry, Centers for Disease Control. In addition, Dr. Cory-Slechta has served on the editorial boards of several journals including *Neurotoxicology*, *Toxicology*, *Toxicological Sciences*, *Fundamental and Applied Toxicology*, *Neurotoxicology and Teratology*, and *American Journal of Mental Retardation*. She has held the elected positions of President of the Neurotoxicology Specialty Section of the Society of Toxicology, President of the Behavioral Toxicology Society, and been named a Fellow of the American Psychological Association. Her research has focused largely on environmental neurotoxicants as risk factors for behavioral disorders and neurodegenerative disease. Specifically this has included work on the impact of lead on learning and attention and associated neurochemical mechanisms, and, more recently on the role of pesticides as risk

factors for Parkinson's Disease. These research efforts have resulted in over 90 papers and book chapters to date. Dr. Cory-Slechta received her Ph.D. degree from the University of Minnesota in 1977.

**Di Giulio, Richard**  
**Duke University**

Richard Thomas Di Giulio is a Professor with the Nicholas School of the Environment & Earth Sciences at Duke University and Director of the University's Superfund Basic Research Center. Dr. Di Giulio's research is focused upon biochemical and cellular responses of aquatic animals to environmental stressors, particularly contaminants. His laboratory is concerned with both basic studies of mechanisms of contaminant metabolism, adaptation and toxicity, and with the development of sensitive, mechanistically-based indices of exposure and toxicity that can be used in biomonitoring of free-living organisms. The long-term goal of this research is to bridge the gap between fundamental toxicological research and the development of mechanism-based approaches for monitoring environmental health. He seeks to utilize the comparative biology paradigm to elucidate linkages between human and ecosystem health. He has consulted extensively, including as a contractor in the development of the Monte Carlo uncertainty analysis for the surface water component for land disposal restrictions determinations for the EPA, and as a science advisor for ecological risk assessments of Superfund sites. Dr. Di Giulio served on the Board of Directors for the Society of environmental Toxicology and Chemistry (SETAC), and Chaired the Membership Committee. He was also a member of the SETAC 19th Annual Meeting Program Committee and Chair of the Plenary Session. He is also a member of the editorial boards of Toxicological Sciences, Human and Ecological Risk Assessment, and Chemosphere. He received his Ph.D., from Virginia Polytechnic Institute and State University in 1982.

**Field, M. Jay**  
**U.S. Department of Commerce**

L. Jay Field Team Leader for Technical Support for Coastal Protection and Restoration Division, Office of Response and Restoration, National Oceanic and Atmospheric Administration (NOAA). Duties include providing technical support to NOAA Coastal Resource Coordinators and U.S. Environmental Protection Agency (EPA) in the evaluation of ecological risk to freshwater and coastal marine resources resulting from releases of contaminants at hazardous waste sites. Recent work has included conducting and evaluating aquatic ecological risk assessments at Superfund sites and the evaluating and developing sediment guidelines. He served on the technical advisory committees for EPA for the Remedial Investigation of the Hudson River PCBs Superfund site, the National Sediment Inventory methodology evaluation, and the Great Lakes National Program Office guidance manual to support the assessment of contaminated sediments in the Great Lakes. Recent publication titles include: Predicting amphipod toxicity from sediment chemistry using logistic regression models; Application of a sum PAH model and logistic regression model to sediment toxicity data based on a species-specific water-only LC50 toxic unit for *Hyaella azteca*; Predictions of sediment toxicity using consensus-based freshwater sediment quality guidelines; Development and evaluation of consensus-based sediment effect concentrations for polychlorinated biphenyls; and Development of a framework for evaluating numerical sediment quality targets and sediment contamination in the St. Louis River Area of Concern. Mr. Field received his M.S. in Fisheries Biology from the University of Washington School of Fisheries in 1984.

**McFarland, Michael J.****Utah State University**

Dr. Michael J. McFarland received his bachelors' degree in Engineering and Applied Science from Yale University, his masters' degree in Chemical Engineering from Cornell University and his Ph.D. in Agricultural Engineering from Cornell University. Dr. McFarland is currently an associate professor in the Department of Civil and Environmental Engineering at Utah State University where his research interests are focused in the areas of air quality management, industrial waste management and pollution prevention. Dr. McFarland has served on numerous federal, state and local environmental engineering and public health advisory committees for the US Dept. of Defense, US Environmental Protection Agency, US Dept. of Energy, National Science Foundation, Utah Dept. of Environmental Quality and Cache County, Utah. Dr. McFarland has authored or coauthored over fifty publications in the field of environmental engineering including engineering textbooks, workbooks, journal articles and conference proceedings. Dr. McFarland is a registered professional engineer in the State of Utah and currently holds Grade IV operator certifications for both wastewater and water treatment. Dr. McFarland is a member of the American Academy of Environmental Engineers (AAEE), the Water Environment Federation (WEF), the Society for Risk Analysis, National Biosolids Partnership and the Association of Environmental Engineering and Science Professors (AEESP).

**Pfaender, Fredrick****University of North Carolina at Chapel Hill**

Frederick K. Pfaender is a Professor of Environmental Sciences and Engineering at the University of North Carolina at Chapel Hill, with a Joint appointment as Director of Ecology for the Carolina Federation of Environmental Programs. Dr. Pfaender's research is concerned with microbially mediated transformations of xenobiotic chemicals in soil, marine and subsurface environments. The primary focus is on identification of the environmental factors that regulate microbial activities. Other interests include microbial ecology, nutrient exchanges in rivers and estuaries, estuarine pollution; biodegradation of petroleum hydrocarbons by patuxent aquifer microbial communities; and biodegradation of detergent chemicals in estuarine and near-shore marine environments. Dr. Pfaender has published on his research in the areas of adaptation of aquifer microbial communities to the biodegradation of xenobiotic compounds: influence of substrate concentration and preexposure; a comparison of microbial community characteristics among petroleum-contaminated and uncontaminated subsurface soil samples; the effect of inorganic and organic supplements on the microbial degradation of phenanthrene and pyrene in soils; and polynuclear aromatic hydrocarbon metabolism in soils: relationship to soil characteristics and preexposure. Dr. Pfaender received his PhD in Microbiology from Cornell University in 1971.

**Splitstone, Douglas****Spiltstone and Associates**

Douglas E. Splitstone is Principal of Splitstone & Associates. He has designed data collection programs to investigate potential environmental impacts in air, water, and soil. Mr. Splitstone has conducted statistical analyses of data related to the extent of site contamination and remedial planning, industrial wastewater discharges, and the dispersion of airborne contaminants. Mr. Splitstone has also developed statistical decision criteria for evaluating when acceptable environmental cleanup levels have been achieved. He has successfully employed geostatistical analysis and estimation techniques for mapping the areal extent and total volume of dioxin

contaminated soils at the site of a former New Jersey pesticide plant. He has also successfully employed these techniques to map the extent of contamination in the sediments of the Passaic River and design the sampling plan for the collection of data to assess the extent of possible contamination by radioactive material in the environs of Department of Energy's (DOE's) Feed Materials Production Center near Fernald, Ohio. He has served as a member of the Task Group on Epidemiology and Statistical Methodology for the USEPA's Center for Environmental Epidemiology at the University of Pittsburgh's Graduate School of Public Health; and previously consulted with Science Advisory Board's Air Toxics Monitoring Subcommittee, and panels on Quality Management and Secondary Data Use. Mr. Splitstone is a member of the American Statistical Association (ASA) and is a founder and past chairman of that organization's Committee on Statistics and the Environment. He was awarded the Distinguished Achievement Medal by the ASA's Section on Statistics and the Environment in 1993. He was chairman for the Sixth Symposium on Statistics and the Environment that was held at the National Academy of Sciences. Mr. Splitstone received his M.S. in Mathematical Statistics from Iowa State University in 1967.

**Theis, Thomas**  
**University of Illinois at Chicago**

Dr. Theis is the founding director of the Institute for Environmental Science and Policy at the University of Illinois at Chicago. Formerly, Theis was the Bayard D. Clarkson Distinguished Professor and Director of the Center for Environmental Management at Clarkson University. Professor Theis' areas of expertise include the mathematical modeling and systems analysis of environmental processes, the environmental chemistry of trace organic and inorganic substances, interfacial reactions, subsurface contaminant transport, and hazardous waste management. He has been principal or co-principal investigator on over forty funded research projects totaling in excess of six million dollars, and has authored or co-authored over eighty papers in peer review research journals, books, and reports. He is a member of the USEPA Science Advisory Board (Environmental Engineering Committee), is past editor of the Journal of Environmental Engineering, and serves on the editorial boards of The Journal of Contaminant Transport, and Issues in Environmental Science and Technology. He has served on numerous professional committees including the Scientific Committee on Problems in the Environment (SCOPE), and the World Bank funded team of scholars for advising the Universidad Nacional Del Litoral (Argentina) on environmental engineering education. From 1980-1985 he was the codirector of the Industrial Waste Elimination Research Center (a collaboration of Illinois Institute of Technology and University of Notre Dame), one of the first Centers of Excellence established by the USEPA, and was Principal Investigator on the NSF-Sponsored Environmental Manufacturing Management Program at Clarkson.

**Windom, Herbert L.**  
**Skidaway Institute of Oceanography**

Herbert L. Windom is Professor/Emeritus at the Skidaway Institute of Oceanography. Research Interests include: Riverine, estuarine and continental shelf and slope geochemical processes; land-sea transport; trace metal biogeochemistry, marine, estuarine and coastal environmental quality; and estuarine and coastal marine pollution. Recent Publications include: Sediment manganese and biogenic silica as geochemical indicators in estuarine salt marshes of coastal Georgia; and General Guidelines for using the Sediment Quality Triad. He served on the Science

Advisory Board Subcommittee of Sediment Quality Criteria; was a consultant to the UNEP GEMS/WATER GEF Proposal Development (Rapid Assessment of Freshwater Resources in International River Basins as a Framework for the Promotion of Environmentally Sound River Basin Management; a member of the Group of Experts on Methods, Standards, and Intercalibration (GEMSI) of the Intergovernmental Oceanographic Commission (IOC) of UNESCO; and a member of NSF Advisory Panel on Biogeochemistry and Environmental Chemistry (1995); and Chairman, GEMS/Water Expert Consultation on the Assessment of Land-Based Sources of Pollution (1995). Dr. Windom received his Ph.D. in Marine Geochemistry from the University of California, San Diego, in 1968.

**Appendix D:**  
**LIST OF ATTENDEES**

**List of Attendees for the Meeting of the  
Contaminated Sediment Science Plan Review Panel of the  
U.S. Environmental Protection Agency Science Advisory Board  
October 30, 2002**

<b>Attendee Name</b>	<b>Affiliation</b>
Bender, Ed	EPA
Casano, Pat	GE
Clark, Milton	Health and Science Advisor to U.S. EPA Chicago Superfund
Deerfield, Kerry	EPA ORD
Engler, Bob	USACE
Erickson, Trish	EPA ORD
Gamboa, Mario	ACC
Garrahan, Kevin	EPA ORD
Gibb, Steve	Risk Policy Report
Hofmann, Lee	EPA OSWER
Kowalski, Lori	EPA ORD
Lueken, Kristen	EPA OSWER
Martin, Lawrence	EPA SAB
Mount, Dave	EPA ORD
Preston, Meredith	BNA
Rowe, Jim	EPA SAB
Shippen, Bob	EPA OW
Wentsel, Randy	EPA ORD

**Appendix E:**  
**SLIDES FROM CSSP WORK GROUP BRIEFING**



# Contaminated Sediments Science Plan

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Presentation to  
Science Advisory Board  
Panel  
October 30, 2002

1

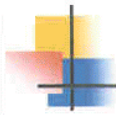


## Overview of Presentation

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- Introduction & Background
- CSSP – Need and Uses
- Organization & Development of CSSP
- Implementation

2



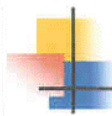
## Extent of Sediment Problem in the U.S.

- *National Sediment Quality Survey* (1997) data indicated potential sediment contamination in all regions and states
- Over 2,800 fish advisories in the U.S., often traced to sediment contaminants
- Significant threat to Human Health/Ecosystem:
  - Sediments are habitats for organisms at base of food chain
  - Sediments serve as a sink for common contaminants (e.g., PCBs and Mercury)

3

**96 Watersheds identified that contain "Areas of Probable Concern" (APCs) from the 1997 National Sediment Quality Survey**

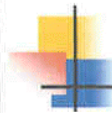




## Background

- NRC Study – Cleanup Strategies and Technologies (1997)
- First National Sediment Quality Survey Report to Congress (1997)
- Contaminated Sediments Management Strategy (1998)

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## Background (cont'd)

- NRC Study – PCB Contaminated Sediments (1999 – 2001)
- SPC Pilot Project on Contaminated Sediments (2000)
- EPA Multi-Stakeholder Forum (2001)
- Contaminated Sediments Action Plan (2002)

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## Contaminated Sediments Science Plan

- SPC project
- Goal: strong scientific basis for addressing contaminated sediments
- First agency-wide science plan
- Responsive to Federal Management and Fiscal Integrity Act (FMFIA) – agency sound science weakness
  - Draft required by November 2001

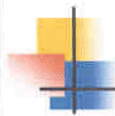
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## Need for a Science Plan

- Contaminated sediments problems cut across media lines
- EPA planning/budgeting processes are linear - stovepipes (ORD, OW, OSWER, Regions)
- Requires cross-program, cross-media communication and coordination

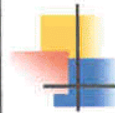
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## A Different Approach

- CSSP is a cross-media, cross-program plan
- Requires cooperation and coordination to develop and to implement
- A “work in progress”

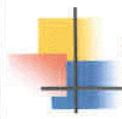
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## Relationship of CSSP to Agency Planning



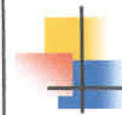
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## Organization of CSSP (cont'd)

- Used the risk assessment paradigm as an organizing principle
- Focused on issues and problems:
  - Related specifically to contaminated sediments & areas of high uncertainty
  - Not dealt with in other Agency documents, e.g., Human Health Strategy, Mixtures Guidance, Cumulative RA

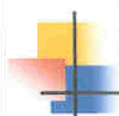
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## Purpose of Science Plan

- Develop and disseminate tools and science
- Enhance coordination and cooperation across Agency
- Develop effective, cost-efficient strategy to promote science activities

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## SPC Pilot – Contaminated Sediments

- Workshop – 6/2000
- Main objective: facilitate cross-agency coordination on research and programmatic activities in management of contaminated sediments
- Results:
  - Inventory of activities
  - Identification of program and research gaps

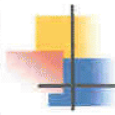
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## EPA Forum - 2001

- Forum on Managing Contaminated Sediments at Hazardous Waste Sites
- 400 stakeholders – Alexandria, VA
- Key research items and data gaps:
  - Sediment stability
  - Ecologically-based cleanup goals
  - Bioavailability
  - Measuring remediation success

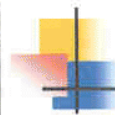
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## Development of CSSP

- Workgroup composed of key EPA personnel
- Used Program/Region/ORD discussions on research priorities
- Consultations with SAB RSAC – June 2001 & September 2001
- Cross-Agency review – fall 2001

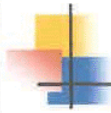
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## Federal Agency Coordination

- Searched the RADIUS database, finding research at 7 other Federal agencies
- Stakeholder Meeting – May 2001
- EPA staff interactions with staff from other Agencies
- New opportunities for cooperation, such as the Urban River Initiative

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## CSSP Implementation

- Contaminated Sediments Management Committee
- Utilization of recommendations:
  - ORD Multi-Year Plans
  - National Regional Science Council and Regional Planning
  - OW Program Planning
  - OSWER Program Planning

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## Contaminated Sediments Management Committee

- Senior managers from OSWER, OW, ORD and Regions
- Implement Contaminated Sediments Action Plan
- Implement CSSP and coordinate on-going projects
- Identify and coordinate resolution of cross-program policy and technical issues

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**Appendix F:**  
**WRITTEN PUBLIC COMMENTS**

**Statement of Dr. Robert M. Engler, Senior Scientist  
(Environmental) to the U.S.E.P.A. Science Advisory Board (SAB) regarding the  
U.S.E.P.A Contaminated Sediments Science Plan (CSSP)**

30 Oct 2002

The USACE is pleased to present the following commentary regarding the CSSP.

Background:

The USACE has conducted extensive research on sediments for the past 30 years at the ERDC Waterways Experiment Station. Subject areas ranged from beneficial uses of suitable dredged material to the identification, assessment and management of contaminated sediments. Emphasis has been placed on all disposal media, such as terrestrial, contained, treated, Great Lakes, riverine, estuarine, near coastal and deep ocean. As the primary regulatory agency for permitting dredged sediment disposal, the USACE in partnership with USEPA Water Programs have set the standard for sediment assessment protocols. We have done the same with treatment technologies in partnership with Solid Waste Programs.

The USACE/EPA. sediment assessment protocols have also been internationally adopted by the London Convention, an 80-nation treaty on ocean disposal and the International Navigation Association (PIANC).

The USACE currently follows standard risk based sediment assessment procedures using weight-of-evidence/multiple lines of evidence approaches. The USACE technology transfer and application program is WEB-based at [www.wes.army.mil/el/dots](http://www.wes.army.mil/el/dots) and contains among other items a fully searchable information base with over 5,000 entries and also lists the 100's of USACE peer reviewed journal articles including many on contaminated sediment management. The USACE Center for Contaminated Sediments, on the above WEB site, consolidates research expertise to specifically deal with the problem of contaminated sediments and has been a significant player in over 25 sediment

clean-up sites as support to the Superfund Program and provides continuing advice to EPA's OSWER. Our WEB site also includes sediment research program information, risk assessments, contaminated sediment assessment manuals, policy statements, education-outreach, contacts, beneficial uses and other related WEB sites. The 30 years of USACE research has been funded at about \$200 million to date and continues. For additional information on current activities see the accompanying Annex 1. As Senior Scientist, I have the overall R&D responsibility for these programs.

## Chapter 1

### Commentary:

The U.S.E.P.A. is to be commended for their efforts to better coordinate contaminated sediments science activities among its various program offices and to focus attention on issues and necessary research needs to fill relevant gaps.

As a plan, however, this effort does not recognize the significant body of completed and ongoing research of other organizations. As described the plan takes a "scatter gun" approach with no consistent framework to catalogue/characterize the significant amount of EPA sediment research into a logical and coherent program that leverages existing and ongoing research. The plan also presents some flawed combinations of research focus areas. Moreover, it ignores the huge research/technology base on sediments developed by USACE, Navy, USGS, NOAA and others as well as the developing international technology base. This approach makes it almost impossible to quantify gaps, omissions and duplications of effort. Even more important, there is little or no description of how the current research is utilized by the their Program Offices (e.g., OWOW, OSWER) and Regions. Section 4.3 describes "recommended approaches to implement the strategy," but no research "strategy" is evident in the CSSP. A number of worthwhile efforts are described in Section 4.2, but there are no rankings or prioritizations of research needs and no general funding estimates in order to set programmatic goals. This results in

somewhat fractured and inconsistent programs. At best, the CSSP will use precious Federal resources while reinventing completed research.

## Chapter 2

The use of the "Inventory" (1997) as a basis for our current understanding of contaminated sediments is problematic as it was based on "old" electronic data, little QA/QC information or sampling objectives with little or no information the objective of the original sampling activity or how the data were to be used. Seriously contaminated sediments (e.g., aquatic Superfund sites) were not included in the inventory. Moreover, well known "clean" areas or areas with minimal influence from anthropogenic sources were designated as "Areas of Probable Concern" based on flawed interpretative criteria. Areas of probable "Risk" cannot be drawn from the inventory because limited exposure information and flawed effects or hazard information. In mid-Chapter 2, the notion of "Risk" is raised, but should have been introduced in Chapter 1 and discussed thoroughly at the beginning of Chapter 2 and then as a key driver for the remainder of the CSSP.

Section 2.5.1 introduces discussion of collaborative efforts within EPA that are not documented in Appendix A and appears to be without substance in Chapter 2. The explanation presented in Section 2.5.2 are ad hoc efforts at best. An exception in the CASRG group. Equally important, there are completed, ongoing, and planned research activities (e.g., USACE, NOAA, DOD, F&WS, USGS) on at least 80% of the proposed research topics in the CSSP that have apparently not been collaborated with in other than an ad hoc basis. The EPA proceeding in the manner proposed will represent a serious duplication of effort.

## Chapter 3

It is not until this chapter that risk assessment appears, but should have been thoroughly discussed in earlier chapters to set the stage for this chapter. As risk assessment is a function of exposure assessment and effects assessment, the key questions should separate these functions (e.g., exposure, effects, risk as separate science needs entities).

Specific Comments

## Exposure Assessment

Develop a thorough knowledge of the physics associated with the stability of soft/finegrained consolidated sediments over a range of forcing conditions (i.e., natural flow, flood/storm flows (25, 50, 100 year episodes) and dredging by mechanical and hydraulic systems. The physics of particle movement and physical forcing functions are necessary before a consistent predictive modeling approach for resuspension and transport can be made available.

Effects (i.e., hazard) assessment should be separated from risk assessment as risk assessment is a function of exposure and effects assessment, and each should have stand alone discussions.

Establish a functional understanding of comparative risk assessment, cumulative risk assessment on comprehensive risk assessment (all inclusive, i.e., economics, social, etc.) leading to practical tools for field assessment.

There needs to be a discussion of setting priorities for this huge array of R&D initiatives and funding sources. Partnering with agencies that have at least 80% of the recommendations either completed, initiated, or planned (e.g., Corps, USGS, F&WS, NOAA, Navy) should be a priority.

The major topic areas are sufficient with some modification.

3.2 Use of the sediment inventory (U.S.E.P.A., 1997a) as the basis for this section may well be the "poster child" for better sampling analytical techniques and QA/QC. The inventory was based only on readily available and up to 13-year-old electronic data sets with little QA/QC and sampling activities with little to no information regarding the objective of the original sampling activity and how the data were to be used. Consequently, little guidance can be drawn from this review regarding the quality, quantity and usefulness of relevant information. Moreover, the probable areas of concern were somewhat arbitrarily selected.

3.2.2. Research on physical parameters should focus on a complete understanding of the physics at the sediment/water interface that controls sediment stability or redistribution (erosion) during normal and high-energy events (natural or anthropogenic). This knowledge should describe the in-situ sediment descriptors that are critical input to predictive models of sediment fate and

effects. The plan discussion completely misses these needs even though the NRC report clearly outlines the needs.

The science discussion completely misses this point. This needs to be written by an expert in hydrodynamic, geotechnical and modeling aspects of sediments in relation to resuspension and transport activities.

Routine sampling activities discussed under science needs are not science needs. The technology already exists.

3.2.3. Although depending heavily on the NRC report and somewhat elementary in nature the science discussion is adequate. Significant research by DOD in this area has been underway for some time.

3.2.4. Develop methods to characterize the physical properties sediment water interface and forcing functions (input energy from natural or mechanical events) in order to better model sediment resuspension and erosion activities in a valid and reproducible manner.

3.3. Exposure assessment must be coupled with effects (hazard) assessment to produce an estimate of risk . Exposure alone is not the solution but must be linked with effect. Significant research should be initiated to model these activities for estimating (predicting) the risks and quantification of uncertainty related to alternative management options.

3.3.1. This section overlaps discussion on effects (toxicity). Bioavailability does not equate to toxicity and in a mixed contaminant system toxicity does not relate directly with individual contaminants. Exposure alone does not equate to risk.

\* A section is needed that deals only with exposure, followed by a section on toxicity (effects). A section on how risk is a function of exposure and effects should come next. Following this, a discussion of research needs of each would be appropriate. The report inappropriately mixes these concepts in a random manner.

3.3.3. This is an important section regarding high priority research needs and the CSSP fails to recognize ongoing and existing research. More importantly, the chapter fails to leverage research by others to maximize resources and capitalize on the expertise of other agencies.

3.3.4. Develop a sufficient knowledge base regarding the physics of sediment stability at the sediment water interface. Develop an understanding of the energy (e.g., forcing functions) that cause a sediment to erode and estimation of its fate.

Section 3.3 needs significant revision as this area has the greatest technology needs. Ecological exposure and human exposure should be separate discussions. Research results from the HSRCS/SW should be considered when discussing bioavailability, especially in relation to equilibrium partitioning. The bioaccumulation of a chemical only exerts toxicity when an organism specific threshold is reached. A residue/effects database for a number of chemicals and organisms is already on WEB sites.

3.4. Effects (hazard) should be separate section. Again Risk is a function of exposure and hazard (effect); not only exposure.

3.5. Same comment as above

3.5.1 Science needs:

Develop consistent weight-of-evidence approaches using multiple-lines-of-evidence and a framework to combine these activities as the basis for risk assessment. Develop a consistent approach to effects based testing.

Seriously question indicators for measuring risk. Indicators can be used to screen for exposure and/or effect.

3.5.3. Hazard/effects should be a separate section not a subset of risk assessment. Risk assessment should be a separate section.

## Chapter 4

Even though the title implies a strategy, the chapter consists of a list of recommendations (tactics) that are components of implementing a strategy. An opening discussion needs to describe strategically (big picture) how the tactics fit together to meet the CS SP goals.

Chapter 4, does not provide a meaningful or specific means to coordinate these activities through a focused interagency process. The activities are all laudable, but without a formal, top down, fully coordinated process, it will remain ad hoc. 4.2 does touch on intra-agency coordination, but provides no mechanism and gives all the research a high priority .

\* An intra-agency approach to provide a consensus framework to develop an implementable research priority list needs to be developed and instituted.

\* Chapter 4 is for long-range strategy, but does not really describe a strategy, moreover there appears to be no short-term strategy to which the above comments refer.

Discussion in 4.2.8 is not sufficient to produce a workable, useful and dynamic intraagency information/data management system. Each of the components are useful but they must be combined and be interactive to be of any use.

\* Inter-agency communication through the recommended WEB site or a subset of a National EPA Sediment site is absolutely necessary because of the breadth and scope of research carried out by partner agencies (i.e., Corps, USGS, F&WS, NOAA, DOD).

G.1. The five HSRC's currently have active community outreach programs. Perhaps the HSRCS/SW could be used as a model for sediment issues.

4.2.8.

H.1. The National Sediment Inventory as it exists is not useful for building a contaminated sediment base of sites that are of concern.

The EPA should seek adequate funding to complete a less flawed, more up-to-date, and comprehensive inventory.

H.3. The ORD is missing from this WEB site development. This site should be the highest priority but should be structured around the CSSP.

H. 5. This is a minimal discussion of a much greater need. These agencies are spending millions of dollars on sediment research. There are also several international organizations sponsoring sediment activities (e.g., IMO, IOC, Sednet, etc.). A strategy to coordinate these activities and tactics to implement must be presented.

The discussion on intra-agency information exchange starts at 3.9., and carries into Chapter 4, and presents a number of activities and techniques but needs to strategically connect these activities to ensure areas are not missed and that duplication of effort is minimized. All of the approaches presented are laudable, but appear to be ad hoc with no clear direction in inter-connectivity.

\* An inteagency WEB site is recommended that is structured around an information exchange and application strategy that contains a searchable data/information base of all products. The WEB structure could be modified around the structure of this report. This report recommends the need but not how to structure it. To make it useful there should be one EPA Program Office responsible for maintaining the system (e.g., OSWER).

In reviewing Appendix A, there is no consistent approach to catalog/characterize significant amount EPA sediment research into a logical framework. The approach is "scatter gun" that makes it almost impossible to quantify gaps, omissions and duplication. Moreover, most of the research is dated (e.g., 1999) sufficiently to render it of limited value. Even more important, it is not clear how the research is transferred and utilized by the EPA Program offices (e.g., OWOW, OSWER) in developing specific guidance.

Some of the most important sediment biogeochemical research has been produced by the HSRC-S/SW (headquartered at LSU) over the past 10 years, yet apparently none of the research results has been applied to Water Program efforts (e.g., sediment guidance toxicity and bioaccumulation and development of the Sediment Inventory).

There are no explanations of how these research effects are peer reviewed and subsequently used by the Program Offices.

- \* EPA should have routine (annually) inter- and inter-agency reviews of their programs to ensure application within the agency and among agencies with an aquatic resource mission (e.g., Corps, USGS, F&WS, NOAA, Navy).

As an example, CASRGW efforts are directly related to results from the EPA-funded HSRC-S/SW, Corps, USGS, NOAA, and F&WS research, ongoing activities, and agency requirements. This type of technology review and implementation appears ad hoc at best. Another example is the Beneficial Use Workgroup at Reg. V, while OWOW is about to produce a beneficial uses report with little or no apparent interaction. The NRMHR work on dredging performance is apparently not interfaced with the environmental dredging effort by OSWER.

- \* There is a need for EPA to develop a research technology implementation strategy to not only coordinate activities but to give guidance as to how the technology is to be implemented by the agency and partner agencies. Implementation appears to be ad hoc.

4.3. A strategy is not presented in this report, but an ad hoc discussion of activities and tactical steps that are part of a strategic plan is shown.

- \* It is recommended that the CSMC be opened to those agencies with sediment research.

- \* The CSMC, as part of their tasks, should also conduct the strategic review and planning in addition to the tactical steps described. The ORD seems to be missing. The CSMC should be a

structural organization with a Director, committees and sub committees as developed from the strategic plan and implementing tactics in order to ensure proper conduct of all of the complex activities.

Table 4-1 should also list partnering agencies that have a critical stake and have ongoing research in those areas. Time frames should be quantified.

## **Review Comments for the US EPA Draft Contaminated Sediments Science Plan -**

**By SSC San Diego, Department of the Navy**

Although there are some good aspects to this document, there are some general flaws summarized below:

- the document does not account for all the work that has already been done or is in process in other agencies, academia and industry
- it is missing some important science and research goals
- the specified goals are not prioritized
- in some cases, the scope is too broad and the science goal is not adequately defined
- there is no clear criteria stated on how the recommendations were developed

This is a dense and multifaceted document, which has obviously benefited from the thoughtful involvement of a number of individuals with a broad range of expertise. Attempts to organize and unify sediment research, within the EPA, and between other agencies, is to be applauded, and should accelerate our progress in resolving these complex and controversial problems. The document is well organized by topic, and critical scientific issues and gaps have been identified. However, the scope of this plan is impossibly broad without some prioritization of recommendations. While it is clear that, if priorities needed to be set at this level, it would have been difficult to generate such a document in which all contributors, with different responsibilities and goals, collaborated to define goals. However, such a prioritization must follow soon. Many of the science goals laid out in a single sentence are actually impossibly complex in themselves, and cannot realistically be achieved on a short timeframe. After prioritization, reasonable timeframes and costs should be laid out. Furthermore, some other science goals that must be addressed if sediment owners are to make responsible sediment management decisions (and comply to draft EPA Sediment Guidance) are not addressed. Some of these will be addressed below.

This document presents a thorough review of sediment-related activities throughout the EPA. However, while the document states that more coordination is required with the work of other agencies, this work appears to be ignored in setting the science goals. In order to set clear priorities, it is important to take the research of other agencies and nations into account.

Specific comments:

**D.4:** In this recommendation, and throughout the document, sediment management options are treated as if they were bimodal, rather than a continuum. As is stated in many documents, including the EPA's "Principles for Managing Contaminated Sediment Risks at Hazardous Waste Sites" and the Draft Sediment Management Guidance, a risk manager must consider all reasonable options. Since sediment management strategies fall into five broad categories, which are to be selected based upon an evaluation of site specific risks and goals: 1) no action, (which is only appropriately applied if it is determined that sediments pose no risk), 2) monitored natural recovery, based on the assumption that, while sediments pose some risk, it is low enough that natural processes can reduce risk over time in a reasonably safe manner, 3) in situ containment, in which sediment contaminants are in some manner isolated from target organisms, though the

sediments are left in place, 4) in situ treatment, and 5) dredging or excavation (followed by ex situ treatment, disposal and/or reuse), it is necessary to examine potential risks from all these options. To suggest that the comparison is merely a question of "short-term risks" of dredging vs "long-term benefits" suggests a strong editorial bias that has yet to be supported with a sufficient quantity of data. Rather, the risks of all potential strategies, or combinations of strategies, must be addressed. The information required to evaluate or compare each of these options can be fundamentally different, and any assessment should be designed to evaluate and support management goals and potential remedial options. Since USEPA guidelines (and the NRC 1997 report) suggest that "All remedies that may potentially meet the removal or remedial action objectives... should be evaluated prior to selecting the remedy", (OSWER Directive 9285.6-08), careful planning is necessary to assure that sampling and analysis plans are designed such that they can address these disparate needs in a meaningful, and comparable, way. There is little or no guidance on how these disparate risks and benefits are to be compared and balanced. It is critical that methodologies for such broad risk comparisons be developed.

D.7 It is very important to assure that treatments carried out to assess the contributions of various contaminant classes to toxicity do not fundamentally change the bioavailability and/or toxicity of those components. By altering sediments and porewaters to isolate contaminant classes, contaminant behavior may be altered. Thus, the validity of TIE procedures must be rigorously established.

E.3 Because of volumes and costs involved, it seems clear that some sediment sites will be managed in place. While sediment guidance recommends an evaluation of site-specific risks and benefits of management strategies in the feasibility study process, technology-specific and sitespecific data on risks or impacts of sediment remedial or management strategies (especially in-place strategies) are sparse. This forces site owners to rely on simplistic technology matrices and generic models with minimal site-specific relevance. As a result, when a risk management team chooses to implement passive, in-place or innovative management strategies at a site, convincing a skeptical regulatory community and public can be a daunting task. Many in-place management approaches and technologies are being developed and marketed, but few have been thoroughly evaluated in terms of the effects of the technologies on the bioavailability, toxicity, fate and mobility of target and non-target contaminants, nor are there data on what characteristics make a site suitable for these approaches. This is a barrier to regulatory acceptance and to site owners taking the risk of what are perceived to be relatively unproven strategies.

There is a need to validate in-place management or containment strategies, as well as in situ remediation technologies. There is also a need to validate a toolbox of analytical and modeling tools in support of the feasibility process for such in-place management, containment and remediation strategies. Without such data, it is unlikely that a wary regulator and stakeholder community will embrace in-place treatment and/or containment processes. However, the R&D community can rarely afford the multi-million dollar efforts necessary to do broad-based, multivariate studies or to test sediment remedial strategies in the field in a meaningful way. To remedy this problem, one of the questions which should be asked is: Who should bear the cost of such studies, if the benefit is for future, not current, applications, but the risk is to the current project? Those who can afford these, primarily vendors and site owners, do not have the incentive to collect the validation data necessary for PRPS and site owners to "sell" these

technologies at other sites. Clearly, site owners are at risk if they look deeper into the impacts of their selected remedy than is required by regulators. Often, technology developers expect others to pay for validation data. Unfortunately, there seems to be little incentive for contractors, regulators, stakeholders or RPMs to streamline the process, since potential risks of innovation are not offset by rewards. If innovative in-place remedial strategies are to be accepted, efforts must be made to balance the risks and benefits, with collaborative consortia that bring extra assessment to site demonstrations, but with some regulatory buy-in. The EPA SITE program and the ARCS programs have filled this function well, primarily for soil and freshwater sites, but more sediment-focused efforts are called for.

E.4 Again, it is assumed that all impacts from dredging are short-term. While this may be true, it seems to be presuming research results before they are complete.

H.6 Extensive work has been done overseas, particularly in Europe, on contaminated sediment assessment and management. It is important that the EPA assures that scientific exchanges have an international component.

GPRA Goal 8, Objective - While models are a critically important tool to aid in sediment assessment and management, they are only as meaningful as the data that goes into them. In many cases, model constants and assumptions are based upon simplified laboratory experiments, or on measurements from sites quite unlike (in terms of chemistry, biology, hydrology, etc.) systems under study. A critical assessment of the validity of numbers going into models, and a push towards site-specific field measurements of contaminant fate and behavior (few sediments behave like model systems) for model input, will assume that models make meaningful predictions for specific sites, rather than theoretical sites.

2.3 Development of TMDLs - sediments can be a sink, as well as a source, of contaminants, and this issue must be addressed in the development of TMDLs.

Page 12, Fish Advisories - while the statistics on water body impairment are quite impressive, a breakdown of these figures into those as a result of sewage spills, blooms or as a result of contaminants likely to come from sediments would allow one to put this information in the proper perspective. The suggestion that sediments may be causing advisories in 100% of Great Lake waters and 71 % of coastal waters may come across as enough of an overstatement that the entire point will be dismissed. Whether this is true or not, this information must be bolstered by separating non-sediment causes where possible.

PBT Initiative - In terms of the Sediment Science Plan, it is important that the focus is on sediment-specific PBT issues. There are many issues specific to freshwater and marine sediments that must be addressed for PBTs, and thus non-sediment-specific issues should not dilute these efforts, as they will be addressed elsewhere,

pp. 21-22 RaDiUS search - it would be useful to have more information on how non-EPA sediment work was evaluated and summarized, and how it was taken into account in plan development. Many of the issues identified by this document are being addressed, in whole or in part, by other organizations or even other nations. It is recognized that the needs and priorities of the EPA, as a regulatory body, may at times be different from those of organizations carrying out

sediment research. The EPA should, however, develop a transparent plan for reviewing, assimilating and utilizing appropriate aspects of this work.

3.2.2 Physical parameters. Although these methods have their limitations (as do all methods), particle size is now being routinely measured using Laser In Situ Scattering Transmissometry (LISST) as well (e.g., Mikkelsen, O. A. and M. Pejdrup (2001) The use of a LISST-100 laser particle sizer for in-situ estimates of floc size, density and settling velocity, *Geo-Marine Letters* 20, 187-195; Mikkelsen, O. A. and M. Pejdrup (2000) In situ particle size spectra and density of particle aggregates in a dredging plume, *Marine Geology* 170, 443-459). This method allows for nondestructive, moist, and in situ measurement of particle size distributions. Such a method has been used to track dredging plumes, etc. This method should be validated.

The workshop recommended on page 32 will help advance the implementation of site characterization approaches.

3.2.3 Chemical parameters. While it is critical to develop and refine sensitive analytical methods for various constituents, it should be pointed out that most analytical equipment can only analyze what is in the solution injected into the instrument. While extensive work has been carried out to standardize extraction methods, it is well known that no standard method quantitatively removes organic contaminants from sediments. Rather, extractability is sensitive to aging, organic content, salinity, nutrient content, and sample handling, to name a few parameters. Furthermore, the degree of extractability in an unknown sample is unknowable (surrogate recoveries show the fate of a spike in the system, not a sorbed contaminant). While some argue that contaminants that are resistant to extraction are most likely not bioavailable, this assumption has not been proven. Further, the fact that minor differences in sample handling can vastly change extractability undermines the argument as well. On the other hand, many workers suggest that the harsh extractions used actually extract much more of some contaminants than is ecologically relevant. The difficulty, of course, is that a solvent is not an organism, and that the question of bioavailability has embedded in it assumptions about modes of exposure (a specific organism, and sediments in a particular state) that may not be relevant for all questions being asked. It is critical that attempts to standardize or improve analytical methods address explicitly extraction approaches and their ecological context.

3.3.1 ESGs for metals. While the SEMIAVS approach is most likely appropriate for very quiescent sediments, many nearshore contaminated sediments are quite dynamic, and may be periodically to frequently aerated and oxidized. Clearly, many infaunal organisms create oxic microenvironments, sediments are more frequently oxic than originally thought, and resuspension events on the shallow scale may be frequent. Little is known about the relative rates of metal mobility vs. sediment redox dynamics in active sediment. Thus, these assumptions must be carefully evaluated in terms of emerging science. These questions are addressed to a certain extent on page 44, but this section suggests that by the time the research is done, metal EQGs will already be firmly established.

3.3.4; B.3 While studies on fate and transport models are important, the focus of this should be on the site-specific meaning of the data that go into them, Field methods for assessing these parameters should be developed and evaluated. Where possible, similar datasets should be run on various models to determine how different and sensitive each is.

3.5.2 Ecological Indicator Science Needs. Benthic communities, as suggested in this section, are sensitive to a number of environmental parameters other than contaminant stress. Thus, if communities are to be evaluated, research and guidance into the proper selection and evaluation of background and reference conditions is critical. If inappropriate reference sites are selected, then misleading conclusions will result.

3.5.5; D.4 Again, this statement assumes that all benefits are long-term and all adverse affects are short-term. This needs to be evaluated and proved. Furthermore, this goal should be expanded to examine effects and benefits of a wider range of remedial strategies (or combinations thereof).

3.6.1 There needs to be some effort to decide on a basic philosophy of the role of stability issues in risk AND recovery. This document seems to be built around the core assumption that in all cases, the lack of chemical and physical stability is bad. This may not always be the proper approach. There appears to be a core assumption upon which many current sediment management documents are being built that has major potential impacts on how sediments are managed in the future. This assumption results from extrapolation of findings from the NRC 2001 report, which focused on the management of PCB-contaminated sediments, but which has frequently been cited as a document on the management of contaminated sediments in general. PCBs and other PBTs are largely anthropogenic, recalcitrant (though we are learning a bit about their biotransformation in some environments), and have a strong tendency to bioaccumulate and biomagnify. This has serious implications for management strategies, as their presence in sediments even at relatively low concentrations presents a continuing risk up the food chain, and thus issues such as dispersion, mixing, bioturbation, etc. can present extreme risks for remedy failure. However, it should be noted that for many contaminants, almost every potential path for exposure (diffusion, advection, mixing dispersion, etc.) also presents a potential for recovery of the sediment (see, for example, Reible and Thibideaux, 1999). What risk assessors and managers must determine is whether the relative rates of recovery and exposure are balanced out in a protective way. Can advection slowly "clean" the sediments without generating toxic fluids for biota? Can mixing dilute sediments to a non-toxic level? Does bioturbation aid in this? In some cases, these unavoidable processes may be beneficial. What is critical to determine is the projected mode and/or mechanism of toxicity which is of concern, and whether transport processes increase or decrease these risks. For PCBs and other PBTs, because of their properties, these pathways often present serious risks. However, many contaminants in sediments (most metals, some PAHs) are toxic only because of their high concentrations in the sediments. There are non-toxic, often even natural, levels of these chemicals in sediments.

In these cases, if carefully evaluated, dispersion, mixing and other mechanisms may be useful routes to recovery, and thus dispersal with dilution may not in all cases be an undesirable process. Risk assessors and managers should base their CSMs on mode of risk (acute, chronic, bioaccumulation, etc.), contaminant of concern, and type of sediment environment. Design of a CSM should identify the pathways and mechanisms of exposure that are of concern. Then, the relative risks and benefits of disturbances for a site can be evaluated. Science and policy should be developed that allow for these different modes of risk and toxicity.

3.6.3 ECGOx. This technology is promising and exciting, but proprietary. Little is known about the mechanism of contaminant destruction, and technology owners are reluctant to provide much information for technical review. It is critical that an evaluation of its success or failure is not

merely based upon disappearance of target compounds. Lessons learned from early experiments in TNT biodegradation that generated more toxic or mutagenic by-products suggest that an evaluation should examine in-situ toxicity before, during and after the demonstration to check for the mobilization of non-target contaminants, or the generation of unanticipated by-products. While it may be difficult to design an analytical plan for unknown reaction products (to allow for mass balance), perhaps some labeled compounds can be used to aid in a partial mass balance effort. If this technology is as effective as advertised, it should receive support, but careful validation plans are required. Engineering feasibility alone will not provide risk managers with the information required to select this technology for their sites.

This comment is true for other potential treatment technologies as well. It is not in the vendor's (or test site owner's) interest to do extensive testing beyond any regulatory requirement (such as disappearance of target compound). Rather, it raises risks of failure. However, most R&D programs cannot afford the large field cost a demonstration requires. As a result, when such expensive engineering feasibility studies are carried out, thorough (and also expensive) ecological evaluation is often not carried out. The SITE program has, at times addressed this issue. More of this should be done at sediment sites.

3.6.4 Dredging. A further need for dredging activities, especially those that might involve CAD or other in-water containment, is for verification technologies. It is important to be able to verify that the dredging contractor puts dredged material where he/she is paid to. Otherwise, short-dumping can result in contaminant spreading.

3.6.5 Ex-situ treatment. An important issue for the evaluation of treatment technologies is an evaluation of how issues of scale and non-uniform feed stock affect costs. While some sites (such as the New York/New Jersey region) may have enough sediment to treat that economies of scale can be achieved, many other regions have sites of relatively small size, and variable sediment type. Thus, sediments may not be of the volume, timing or uniformity to allow for efficient operation. The costs being published must help site owners evaluate these issues when they consider the technologies being promoted. It should also be noted that extensive work on these subjects has been carried out in Europe, notably in Germany, Belgium and the Netherlands. The EPA should endeavor to integrate these findings, and to avoid duplication of effort.

3.6.6 and 3.6.7 There has been extensive work on these topics in Europe and Asia (Hong Kong). The EPA should endeavor to integrate these findings, and to avoid duplication of effort.

3.7 While there is much yet to be learned about the long-term impacts of various technologies, there is not a complete vacuum. There have been more studies than are invoked in this document, in the US and abroad. The EPA should endeavor to integrate these findings, and to avoid duplication of effort. Furthermore, it is important that baseline and background data needs are clearly defined, and that long-term monitoring is designed around realistic Conceptual Site Models in order to be meaningful. Another issue that must be resolved is what is to be done with monitoring data? What are the contingencies if a technology is deemed to have failed? How much certainty or uncertainty do we have around what constitutes a success? Are we designing realistic management goals? Are they measurable?

4.2.2; B4 While it is important to evaluate models, it is even more important to assure that the data going into them are appropriate, meaningful and site-specific.

4.2.4; D4 Again, sediment management options are not bimodal in character, but involve a range of options, the risks and benefits of which must be evaluated. This section, particularly the last sentence of the second paragraph, is clearly pre-supposing the outcome of the study. While that presumption may be correct, such a clear editorial bias undermines scientific credibility.

4.2.5; E1 This is a very important, but incredibly complex, goal. Until these multiple mechanisms for contaminant release are better understood (and in comparable terms), models to predict and balance risk and recovery will be of limited value.

E3 As stated above, evaluation of in situ treatment technologies should be carefully designed to evaluate changes in toxicity, contaminant bioavailability (target and non-target contaminants) and the generation of unanticipated by-products, rather than just the disappearance or immobilization of target compounds.

4.2.8; H1 While most site interpretation and negotiation will be based upon highly processed data (i.e., graphs, statistical summaries, contour plots, etc.), it is important to also assure that all data collected are available in a relatively unprocessed, preferably digital, form. This allows for the repeated use of data, to address questions possibly unanticipated at its collection. For instance, while total PAH (tPAH) numbers are needed to compare to potential sediment quality criteria or benchmarks, the PAH fingerprints (the relative distribution of individual PAHs) can provide a significant amount of information on source, background, weathering patterns, potential toxicity and the potential for natural attenuation. Thus, although generating tPAH numbers may be the primary purpose of an initial data collection, processing and storing the more detailed distribution information allows for more detailed analysis, if necessary, at a later date. Normalizing contaminant levels to or plotting against sediment characteristics which tend to indicate natural metal-rich particles (e.g., Fe, Al) or fine-grained particles (e.g., Fe, Al, %fines, %OC) can provide insight into whether there is a site-specific source of a given COC. However, that alone will not provide sufficient information to trace COCs to a given source, which may be necessary either to control sources, differentiate multiple sources or to allocate responsibility. More detailed examination of contaminant signatures, such as the relative distribution of individual compounds in an organic mix, the isotopic signature of metals or organic compounds, or the presence or absence of various markers can help elucidate these questions. For instance, while total PAH (tPAH) numbers are needed to compare to potential sediment quality criteria or benchmarks, the PAH fingerprint (the relative distribution of individual PAHs) can provide a significant amount of information on source, background, weathering patterns, potential toxicity and the potential for natural attenuation (e.g., Page et al., 1995). There is a rich literature in the field of environmental forensics (e.g., Morrison, 2000 and references therein), While this field has primarily focused on terrestrial sites, some work has been carried out in marine sediments, and methodologies should be adapted and standardized for marine sediment systems. Data collection and management should be of sufficient quality to aid in potential contaminant source identification.

**Appendix G:**

**CSSP REVIEW PANEL DRAFT WRITTEN RESPONSES TO CHARGE QUESTIONS**

Plan n.

A method of doing something. A method of carrying out a design. A detailed program of action. An orderly arrangement of parts of an overall design or objective

Webster, 1970

### **Charge Question No.1**

Are the goals and objectives of the plan understandable and appropriate to the subject and does the CSSP adequately convey the need for such a planing document ?

A Response by:

W.Frank Bohlen

Herbert Windom

Tom Theis

The Contaminated Sediments Science Plan as presented, represents the results of nearly two years of effort by a cross-agency group of EPA staff familiar with and working in the area of contaminated sediment. It is an ambitious effort and speaks to the knowns and unknowns, the science and research, management, implementation, and communication. It considers both the short term needs and long term strategies. Its breath is clear indication of care in preparation and the importance of the subject as it affects the EPA mandate. This breadth and the associated complexities and unknowns leaves the reader with a clear sense of the need for careful planning if anything like an orderly and timely resolution of the issues affecting the management of contaminated sediment sites is to be realized. One might conclude then that the CSSP does "adequately convey the need for this planning effort". This conclusion however, is necessarily based on the assumption that the reader has gone through and understands the bulk of material presented in this document. Unfortunately, this will seldom be the case given the length of the document and the complexity of the subject. With this in mind the document would benefit from the addition of a clear concise statement outlining the need for the plan. The inferential approach used at present is based on assumptions that do not appear to be justified.

Plan justification might start with an introduction to the framework used to manage science activities within EPA. We believe that this understanding will also benefit the subsequent discussion of Plan implementation. How are the annual science priorities established by the agency ? Is this effort based on cross-agency communication ? How do these priorities affect the call for proposals (if appropriate) from external organizations and/or the annual

science plans by EPA region, laboratories, HSRCs, etc. ? With this information presented it should be a simple matter to justify the development of this plan and to more clearly establish its place in the larger Agency framework and the likelihood that its implementation will result in an increase in our understanding of the variety of issues associated with sediment bound contaminants and the management and remediation of these sites.

The clear statement of need directly complements the establishment of planning goals. As presented the CSSP has three goals:

1. Development and dissemination of tools and science necessary to address the management of contaminated sediments.
2. Enhancement of the level of coordination and communication of science activities dealing with contaminated sediments across the Agency
3. Development of an effective, cost-efficient strategy to promote these scientific activities including research.

These goals are clear, reasonable and rich in meaning. However, review of this draft document as well as the comments made during the Conference Call on October 17, 2002 by Dr. Hofmann points to the need for an additional goal that might read:

1. Establishment of an cross-agency administrative framework for the prioritization and management of science dealing with contaminated sediments.

Since both administration and prioritization is essential to successful implementation this framework would appear to be the place to start the overall planning effort. The fact that this framework was not mentioned per se in the draft might again be a matter of the Committee believing it to be inferred by Goals 1-3 . A clear statement of the goal is to be preferred. This goal would also contribute to the long-term value of this planning effort. Much of the material presented represents present day unknowns and concerns. If plan implementation is at all successful these issues will change with time. What will remain is the framework for evaluation, prioritization and implementation. In structuring this framework attention should be paid to both coordination within EPA and coordination with external agencies and/or organizations dealing with the contaminated sediment issue (e.g. NSF,ONR, USACE, industry, etc.). The resulting potential for collaborative effort represents the best opportunity to achieve real progress in a relatively short period of time while minimizing redundancy.

With respect to Goals 1-3, there is little indication that the plan accommodates changing needs. This issue is discussed to some extent in the draft leading to recommendations regarding plan life and review frequency. This suggests that a dynamic plan is the goal. A word or two indicating this in the master listing would make clear the intent that this effort would result in the establishment of a protocol(s) with at least the potential for long-term benefit.

**Overall Document Comments**

- 1.01           The entire document suffers from a lack of focus and organization. The different topics addressed in Chapters 2 and 3 are a good start at defining where problems exist, but do not present any coordinated plan for organizing the information or assigning priorities. It is a shotgun approach and while most of the identified needs are real and need attention, a lot of money and effort will be wasted if there is not a logical framework on which to hang the work. The list of topics are of themselves reasonable, but they are not tied together in any way and therefore progress in one area may not help the others. As an example, better categorization of physical and chemical sediment characteristics would have an impact on what kinds of bioassays are needed for toxicity and exposure assessment, which will in turn change the risk assessment, the models and probably the most appropriate remediation strategy. Clearly their first objective and highest priority should be building the framework.
- 1.02           It looks a lot like a document put together by a group where each individual got their particular topic into the mix but with no real attention was given to how it would be integrated and used. This raises a fundamental question not addressed by the document which is to whom it is directed. Is this an internal EPA effort that will guide their in-house programs or is it intended for a broader inter-agency plan. This does not solve the lack of organization, but that should be based on who and how the document will be used.
3.             As is common for EPA there is a bad case of "not invented here" thinking. There are many other agencies and organizations addressing the same research efforts defined by this document. In many cases that research is quite advanced and has accomplished some of the goals stated by EPA. There is a large world out there and this document presents a rather myopic view.

While clearly this Science Plan is not intended to provide a comprehensive review of relevant science, coverage of the literature overall seems rather spotty. In particular, it seems to rely too heavily upon EPA and other governmental reports and related gray literature. A broader coverage of the literature focusing upon primary peer-reviewed articles would enhance the report's credibility.

4. Appendix A lists only EPA efforts and does not recognize other effort by ACOE, NOAA, USGS, and others. In most of the document and in Appendix A the issues of data quality is not really addressed. Much of the data was not collected with the intent of being used in the way suggested by the databases. There are significant questions by many as to the quality of this data.
5. Chapter 2 presents the relevant legislative mandates that EPA must address and does so in a reasonable way. Reference is made to many EPA reports and documents, but it is not clear how to acquire access to them. It depends a good bit on the potential audience for this document, but in most cases finding and gaining access is not easy. There need to be links for those documents on the web, or footnoted information on where to get them. If this is totally in in-house document this may be a smaller issue since the EPA staff might know how to get to them, although I doubt it in all cases.
6. Throughout the document there seems to be a lack of recognition that risk assessment is a function of exposure and effects assessment, and each could stand alone. There should be more emphasis on building a functional understanding of comparative risk assessment, cumulative risk assessment or comprehensive risk assessment (all inclusive, i.e., economics, social, etc.) leading to practical tools for field assessment.
7. Throughout the document there seems to be a lack of recognition that risk assessment is a function of exposure and effects assessment, and each could stand

alone. There should be more emphasis on building a functional understanding of comparative risk assessment, cumulative risk assessment or comprehensive risk assessment (all inclusive, i.e., economics, social, etc.) leading to practical tools for field assessment.

### **Specific Issues:**

#### **Chapter 2**

Pg 10, para 2- They have left direct toxicity off their list of effects

Pg. 11., section 2.3- Sediments have the potential to have significant impacts on drinking water but it is not addressed.

Pg. 12, and throughout Chapters 2 & 3- In calculation of TMDL and other exposure, risk and modeling efforts raise significant questions as to what concentration to use in the assessment for hydrophobic, bioaccumulative chemicals. The bioavailability issue is raised in many sections of the document, but not dealt with in terms of how it may impact how concentration is considered in the assessments. The mechanisms that regulate bioavailability will have a large impact on site characterization, the exposure assessment, risk assessment, modeling, and certainly remediation but it does not appear as one of the research needs or priority areas.

Pg 15, Great Lakes Toxics Strategy- Supposedly we are 5 years into the effort to achieve reductions. What progress has been made?

Section 2.5.2- External collaborations are identified as a list of who is involved with no substance as to the goals of the collaboration, the roles of the partners, nor accomplishments. This does not suggest that these collaborations go far beyond sharing names on a masthead or sending representatives to meetings.

## Chapter 3

### **A. Sediment Site Characterization**

The CSSP makes several references to the concept of sediment stability (e.g, key recommendations A1 and B4). While it is important to understand whether sediment in a specific area (e.g., an individual hotspot) will remain in place, the key issue for site characterization and risk assessment is contaminant mobility. Biological processes may play an important role in sediment stability and contaminant mobility. Current models include these processes in a very limited way, if at all. Research is needed to better understand and measure these processes and to incorporate them into contaminant fate and transport models. Any workshop to address these issues must include this area.

Sediment dating: Guidance on the reliability of current sediment dating methods (eg., Pb 210, Cs137, Be7) in different habitats would be useful, including strengths and limitations in application to assessment of sediment stability.

The CSSP should explicitly include the floodplains as an integral part of the assessment of many riverine ecosystems and a link to terrestrial food chains. Floodplains should be considered during sediment characterization, ecological and human exposure and risk assessment, remediation, monitoring, and risk communication. Guidance on the characterization and risk assessment of floodplain contamination would be useful.

Pg. 66, Sec. A.1. Physical Parameters: One mechanism for tracking net erosion and deposition (for example at a capped site) is to do precise bathymetric measurements. Some of the current methods also document the texture of the sediment bed.

The discharge of NAPL, especially DNAPL, into the aquatic environment is difficult to characterize or remediate. Research needed on sediment sites affected by sub-aquatic NAPL discharge: How many sediment sites are affected by sub-aquatic NAPL discharges? How can

these be remediated? What can be done to prevent future discharges of NAPL, especially DNAPL, into waterways?

The discussion concerning analysis of endocrine disruptors (here and elsewhere) is somewhat problematic. Endocrine-disrupting chemicals are not a class of chemicals for which particular methods of detection can be developed. Moreover, probably all classes of chemicals alluded to in the report (PCBs, PAHs dioxin, pesticides, and metals) include members that have been shown to have endocrine-disrupting activities.

Among endocrine disruptors, alkylphenol ethoxylates (APEs) are highlighted. Given the number of reports concerning these compounds in the environment, are there not some analytical techniques available that at least merit mention?

In terms of emerging issues, pharmaceuticals appear to be of at least equal concern as APEs. Pg. 30, Sec. 3.2.2. Physical Parameters. In order to understand the "fate and transport" of sediment contaminants, it is necessary to also understand the fate and transport of contaminants in air and liquid phases, both dissolved and in concentrations in excess of dissolved, because contaminants have the ability to transfer between different environmental compartments, e.g., from sediment to pore water, from pore water to the water column, from the water column to the atmosphere (and in the reverse direction). Accumulating data shows that water concentrations may be greater than predicted from solubility limits. The relevant question is a holistic evaluation of contaminant fate (sources and sinks), not just the transport of contaminated sediment. New research should begin to explore the rates of transfers, which would help develop more realistic dynamic models. Models currently assume equilibrium and/or steady state; simplifications that may be so unrealistic that the resulting conclusions are erroneous.

Contaminant transport models often lack the fine-scale spatial and temporal resolution in sediment transport models that would be required to make accurate projections of concentrations in biota or to describe ongoing redistribution of sediment deposits under low or moderate flow conditions.

## **B. Exposure Assessment**

Floodplain models: For many contaminated sediment sites in aquatic environments, floodplain contamination is a significant source of exposure to aquatic and terrestrial (and human) receptors, but is currently not included in the sediment fate and transport models for major contaminated river sites. Modeling approach to address contaminant transport to and from floodplains should be developed.

*B.3 Develop and advise on the use of the most valid contaminant fate and transport models that allow prediction of site-specific exposures in the future.*

The "most valid" contaminant fate and transport (including foodweb) models will require data not directly attributable to sediments. For example, the surface microlayer may be important for transfer of organic contaminants to surface feeding biota, including aquatic insects and the birds and fish that feed upon them.

*Bioavailability: Some sediment contaminants exert toxic effects by being accumulated to greater degrees in successively higher trophic levels.*

Contaminants such as PAHs are metabolized by fish and other vertebrates, do not accumulate in tissues, and are known to be highly toxic. Developing the tools to measure exposure of PAHs to fish is a research need.

PAHs are mentioned with PCBs as "persistent and bioaccumulative toxicants." However, PAHs behave much differently than halogenated aromatics (e.g., PAHs are much more readily metabolized, and metabolites often of primary concern). Given the great importance of PAHs as sediment contaminants, the complexities and techniques for measuring their occurrence in food chains merits mention.

Pg. 39, Science Needs: Contaminant transport modeling needs to include biological processes as a component transfer process in addition to the foodweb module added at the end of the physical-chemical model. Biological processes modify the physical and chemical attributes of

contaminated sediment. For example, gas generation resulting from microbial degradation of organic matter can have a significant effect on bulk density, critical shear stress, and sediment erosion rate.

Biodegradation/biosequestration of contaminants by micro-organisms, effects of bioturbation on erodibility, and degradation of macrophytes contaminated from growing in contaminated sediment can transfer contaminants from subsurface sediment to the surface where hydrodynamics may move this contaminated organic material to other areas.

Further research is needed on the role of aquatic vegetation in contaminant cycling.

Lipid measurements play an important role in ecological risk assessment of PCBs and relating sediment concentrations to concentrations in biota. Uncertainty in lipid measurements, lipid physiology, differences among species, temporal (seasonal and annual) differences within species. Need standardized methods of analysis. understanding different lipid types and the importance of the different types of lipid.

The ability to assess toxicity from mixtures of contaminants in sediments should be given a very high priority. Developing, improving, and testing sediment quality guidelines for the protection of benthic organisms, whether empirically-derived or theoretical (EqP), requires data from different contaminant gradients. Contaminated sediment site assessments invariably address contaminant mixtures. Assessing impacts chemical by chemical will severely underestimate the true response. Research and guidance on approaches to assess the toxicity of mixtures of contaminants in sediment that account for interactive effects based on mechanisms of toxic action, is a major need that should receive more emphasis. This should include acute and chronic effects on benthic macroinvertebrates and higher trophic level organisms for bioaccumulative contaminants.

Fate and transport models often play a major and controversial role in evaluating remedial alternatives and making future predictions under different scenarios. The current limitations and

key uncertainties associated with the use and evaluation of these models should be a research priority.

### **C. Human Health Effects and Risk Assessment**

This section is very brief and cryptic (e.g., relative to Section 3.5). Perhaps this reflects the agency's conclusion that human risks are of less concern than ecological effects in the context of contaminated sediments. If so, this should be stated in the report, with the basis for that conclusion. Otherwise, the reader is left with the impression that the authors are either biased to and/or more knowledgeable concerning ecological versus human health impacts.

Of course, a review of potential human effects from chemicals known to occur in contaminated sediments is far beyond the scope of this report, key concerns should be noted, together with approaches for assessing risks from environmental exposures. Key impacts would likely include neurotoxicities, cancer, effects on the immune system, and effects on reproductive and development.

A sizable literature exists related to many of the chemicals that are pertinent to contaminated sediment sites. No indication is provided as to how or whether it has been utilized as part of the process of generating the CSSP. How would human health effects research needs relate to what we already know? A significant complexity for risk assessment comes from the problem of mixtures and this is acknowledged in the plan in chapter 3. Somehow, this not only does not make the list of recommendations, the recommendation is to study PCBs on a congener by congener basis, for reasons that are not at all apparent. How this would improve human health risk assessment is puzzling at best. While sensitive sub-population studies are also mentioned, again this recommendation does not appear in the final recommendations, even though such studies would certainly be critical in defining the limits of risk.

Key recommendations also include assessment of dermal exposures yet not data is presented to substantiate that this route of exposure is a greater problem than are exposures occurring via other sources, e.g., through the food chain, which would presumably target much larger

populations. Similarly, the basis for a recommendation that singles out APEs is not supported by any documentation either.

Thus, in general, the rationale for the recommendations that were derived for human health effects and risk assessment is poorly described and without adequate rationale despite a sizable scientific literature on many of the compounds and chemicals that would be relevant and that should guide direction.

#### **D. Ecological Effects and Risk Assessment**

Endangered species: Develop guidance for assessing risk to endangered and threatened species and for evaluating protectiveness of remedial alternatives to protected species. Guidance should address data collection needs and interpretation in exposure and effects assessment.

High trophic level effects: There is very little science proposed for examining effects of bioaccumulative contaminants on high trophic level fish or marine mammals, such as the high concentrations of PCBs in Puget Sound marine mammals, the recently discovered high levels of DDT in lake trout in Lake Chelan (Washington). This type of research would help establish contaminant transfer mechanisms and dynamics with the potential to affect human populations.

Developing, improving, and testing sediment quality guidelines for the protection of benthic organisms, whether empirically-derived or theoretical (EqP), requires data from different contaminant gradients. Contaminated sediment site assessments invariably address contaminant mixtures. Research and guidance on approaches to assess the toxicity of mixtures of contaminants in sediment, including synergistic, antagonistic, and additive effects, is a major need that should receive more emphasis.

Ecoindicators: major limitations exist in applying benthic community analysis to remedial decision-making. Benthic community analysis is needed in different types of habitats, including addressing uncertainty, lack of power, difficulty in establishing reference sites.

Use of site-specific assessments for improving understanding of ecological assessment toolbox: toxicity test side-by-side comparisons of different test endpoints, relative sensitivity, importance of test conditions. Regional interlaboratory comparisons are needed, including labs outside EPA. Direct toxicity: need for more chronic test endpoints for benthic species and acute/chronic ratios for sediment tests.

The issue of chemical mixtures seems to be slighted in this section (in favor of more chemical-by-chemical approach). Given that in the case of contaminated sediments, mixtures are more the rule than the exception, more discussion of approaches for dealing with impacts of mixtures (an expanding area in the literature) should be included.

An important area of relevant science that is excluded is that of impacts of multiple generation exposures in aquatic organisms, including adaptations, associated fitness costs, and effects on gene structure and diversity ("evolutionary" impacts). This can be very important in field studies, and in making laboratory - field extrapolations.

## **E. Sediment Remediation**

Pg. 73, E.2. There are numerous capped sediment sites that should be tracked in addition to the "big" sites. For example, the Georgia Pacific site in Bellingham (WA) capped mercury contaminated wood chips. A pilot project for electro-winnowing is being tried in Bellingham, also. The Ashley River in Charleston (SC) has a concrete cap on DNAPL. Unless adequate monitoring is conducted and broadly reported, the opportunity to learn from these sites is an opportunity lost.

Research is needed on the effects of habitat alteration resulting from capping and dredging remedies.

Restoration of the aquatic environment is a major goal of sediment remediation. Guidance on approaches to restoration and monitoring the success of restoration actions is needed.

## **F. Baseline, Remediation, and Post-remediation Monitoring**

Exploring designs of new dredges or dredging methods or even about disseminating information about new environmental dredges (such as the one pilot-tested at New Bedford) to remedial project managers.

Compile and review information on the methods and results of remedial effectiveness monitoring for sediment sites, with particular emphasis on sites that addressed risk assessment goals.

## **G. Risk Communication and Community Involvement**

## **H. Information Management and Exchange Activities**

Information management: While it certainly makes sense to compile regional data into databases and to make these databases feed national databases (such as the NSI), it is important to identify the intended audience(s) and the proposed uses (i.e. identify the questions) beyond "sharing information" The important research questions that such databases could be used to address should be used to inform the database development. There needs to be additional QA/QC in deciding what to include in the databases.

Compile information from focused research at contaminated sediment sites, which provide an opportunity to test new methods and approaches to characterizing, assessing, and monitoring. In addition to providing an opportunity to test new methods alongside the standard methods used at the site, it may also provide useful additional information to assist the remedial decisions.

### **Charge Question No. 3a**

Do the CSSP recommendations meet the CSSP's goals and objectives?

The CSSP contains three goals:

Goal 1 Development and dissemination of tools and science necessary to address the management of contaminated sediments

Goal 2 Enhancement of the level of coordination and communication of science activities dealing with contaminated sediments across the Agency

Goal 3 Development of an effective, cost efficient strategy to promote these scientific activities, including research

In support of these goals, the CSSP puts forward 33 recommendations, divided across eight categories, and classified according to long versus short-term priorities. For each recommendation the EPA offices (and in some cases other federal agencies) that are principally involved in its implementation are identified. In addition there is a section (4.3) on Recommended Approaches to Implement Strategy. Although there is some degree of overlap, twenty-five of the recommendations are mainly in support of goal 1 (A.2 through A.4, B.1 through B.4, C.1 through C.4, D.1 through D.7, E.1 through E.5, F.1, and G.1), and eight of goal 2 (A.1, F.2, and H.1 through H.6). There are no direct recommendations in support of goal 3.

#### **Goal 1**

The report articulates many important scientific questions; however it is not clear if these are the *best* set of questions. For example, issues specifically addressing sediment sampling regimes, and statistically defining adverse risk in terms of analyte measurements need to be emphasized. And although recommendation A.4 focuses on the need to obtain more information about endocrine disruptor compounds, the larger issue relates to the development of a framework for identifying worrisome substances *before* they are released into the environment, thereby

changing fundamentally the way science and policy at the Agency interact. More importantly, the element of the CSSP that is critically lacking is information on the *process* that has been used in establishing research needs. It is recommended that the Agency make this process clearer, articulating the steps involved, the degree to which external input has been included, and the methodology of how feedback from outcomes is intended to be used to improve the CSSP in the future.

## **Goal 2**

Coordination and communication across the Agency are critically important areas that must be addressed. If a clear plan cannot be articulated now, at minimum, the science should be better coordinated so the plan can be effectively modified. The plan seems particularly deficient in this area. The major mechanisms that are put forward for achieving these ends are workshops and conferences for EPA managers and perhaps others from related government agencies. These are important, but only begin to deal with the problem. For instance, allocating sufficient resources with a clear aim to improve coordination, or altering the way Agency scientists and managers are recognized and rewarded, would advance this goal more effectively. It is therefore recommended that the Agency provide adequate resources to continue the planning process.

## **Goal 3**

As noted above, there are no specific recommendations in support of goal 3. However, the report does make several suggestions, summarized in section 4.3, about how the strategy for sediment scientific activities should be implemented. Major tools consist, again, of workshops and meetings, surveys of Agency activities related to sediments, coordination through the CSMC, identification of unfunded activities (although it is unclear how these will be prioritized for funding), and ongoing updating of the CSSP plan. Taken together, these might be viewed as a framework for carrying out specific recommendations, but fall short of a true “implementation plan”. For instance, the “cost-effective” need (which is assumed to be inclusive of dollar and personnel allocations) articulated in goal 3 is not addressed. The most important suggestion is probably the last one, namely to view the CSSP plan as an evolving document that will require continual updating and revision as specific information becomes available, and needs and results are established. It is suggested that the CSSP be reviewed at regular intervals, and that specific

recommendations related to the formation of an implementation plan be developed.

### **Charge Question No. 3b**

Are the key recommendations clearly defined and appropriate to address the identified CSSP science needs and are the priorities identified appropriate

#### **GENERAL COMMENTS**

Most of the recommendations described in Sections 3 and 4 address important scientific or program needs within the Agency and are appropriate for inclusion in this document. In some cases the recommendations do not appear to correspond with the identified science needs. This disconnect appears to be the result of an incomplete presentation of the process used to identify and prioritize science needs within the organization.

- **The recommendations do not adequately consider relevant research by other organizations**

There are many other agencies and organizations addressing the same research efforts defined by this document. In many cases that research is quite advanced and has accomplished some of the goals stated by EPA. This document rarely acknowledges that work and does not provide an assessment as to whether any of the science needs or recommendations are being addressed by other agencies. Appendix A lists only EPA efforts and does not recognize other efforts by ACOE, NOAA, USGS, and others.

- **Issues of data quality are not adequately addressed**

In most of the document and in Appendix A the issues of data quality is not really addressed. Much of the data was not collected with the intent of being used in the way suggested by the databases. There are significant questions by many as to the uniform quality of this data

- **The prioritization of the recommendations is not sufficient**

Because the CSSP is not structured around any meaningful framework, it is hard to know what to do with the time frames. There are far too many immediate time frame recommendations to be achievable. They need to get it to no more than two per topic. It may be helpful to establish additional tiers of priority within the immediate and longer time frame categories. This would be easier if there was at least a conceptual framework that integrated the different elements of the CSSP. Definitions of what constitutes an immediate versus a longer time frame should be provided.

- **The identified partners for the recommendations should include other agencies**

In almost all cases the partners suggested for each recommendation are within EPA, when in fact many of the critical partners are agencies such as the U.S. ACE, NOAA, and USGS. The suggested partners for many of the recommendations should identify where in other agencies, companies, universities relevant research and demonstrations are happening. The early sections of the document should include a statement regarding the intent to incorporate the ideas and data from outside research into EPA's programs. EPA does not have the expertise, people, or money to conduct all of the recommended science, so they need to leverage their work with the on-going work of other groups.

- **The implementation strategy for the recommendations is incomplete**

Section 4 of the plan appropriately recognizes that cross-agency collaboration and coordination is essential to the successful implementation of this plan. This section also correctly identifies three critical activities that must take place in following years: review of the status of the science within EPA, coordination in planning among offices and regions, and identification of needed partnerships. However, the plan does not go far enough in describing these activities to ensure that the implementation of the recommendations will be successful.

An expanded description of each recommendation is included in Section 4, which sometimes indicates the lead EPA office and describes future activities. Recommendation F.2 is a good example of this format. Many of the recommendations do not include this information. Instead, a restatement of the problem or need for information is the only thing provided, which is often redundant with Section 3. The description for each recommendation included in this document should identify the next steps to be taken and which office is to be the lead. The lead partner should also be clearly identified in Table 4-1.

One of major recommendations (page 80) is to review science activities on a regular basis. This is critical. It is also very important that this activity include participation from other Federal agencies, industry, academia and international organizations. EPA needs to be more expansive in their vision and thinking.

The science plan is lacking a framework that ties together the recommended implementation activities and thus provides a blueprint to moving forward on the recommendations and future revisions of the plan. Now that recommendations for all of these different aspects of the plan are in place, they obviously cannot all move forward in their entirety, and recommendations and accomplishments in some are critical for progress in others. The implementation framework should be accompanied by realistic priorities and describe how research within the different subject areas (key scientific questions) will be coordinated and integrated across the different topic areas. Without such a framework, the CSSP may serve primarily as justification for each department's own research interests, rather than achieve the goal of a pragmatic approach to moving the science of environmental protection forward.

## **SPECIFIC COMMENTS**

### **Sediment Site Characterization**

#### **3.2.2 Physical Parameters**

The suggested workshop is a good idea, but only if it includes participation by ACOE, NOAA, USGS, Coast Guard, Navy, academic community, etc. They probably know at least as much and maybe more than EPA. Some agreement on common methods could not only reduce the costs, but make data sharing possible.

Key Recommendations for sediment site characterization suffer from the absence of any prioritization scheme and the associated rationales for those priorities.

A.1. The workshop needs to first identify what parameters are critical and which might be used to represent an integrative measure of a number of sediment characteristics. Then they need to look at what are the priorities for information and invest their money in better methods for those parameters first. The participants, outcome, and focus in the workshop have not been clearly defined. Is one such workshop sufficient? Would extramural communities be involved? What would be done with the products from such a workshop?

### 3.2.3 Chemical Parameters

The science needs defined for the Chemical Parameters section of the chapter seem very vague and suffer from the absence of prioritization. Which contaminants should be highest priority for detection. Again, how would work going on in the extramural community be incorporated? it is not clear how the specific needs, alkylphenol ethoxylates, fish contaminants, etc were chosen.

Key Recommendations. These are consistent with the science needs but do they in fact represent the actual needs that a larger perspective group including stakeholder might come up with. If they are not then EPA doesn't get as big a bang for their bucks. If there was coordination with other agencies and some dividing of the research load there could also be significant advances for less EPA dollars. Many revolutionary changes in analytical methods, real time monitoring, remote sensing, continuous monitors with telemetry, bioassays on chips or arrays, new molecular methods for bioassays- where do these fit?

Research to better define the physico-chemical characteristics that control contaminant transport and fate, including bioavailability, should be included as a recommendation. This information is needed to establish priorities for the development of new analytical methods.

The recommendation concerning analysis of endocrine disruptors (A.4.) is somewhat problematic. Endocrine-disrupting chemicals are not a class of chemicals for which particular methods of detection can be developed. Moreover, probably all classes of chemicals alluded to in the report (PCBs, PAHs dioxin, pesticides, and metals) include members that have been shown to have endocrine-disrupting activities.

Among endocrine disruptors, alkylphenol ethoxylates (APEs) are highlighted. Given the number of reports concerning these compounds in the environment, are there not some analytical techniques available that at least merit mention?

The development of analytical methods for pharmaceuticals in the environment should be given similar priority as methods development for APEs.

### **Exposure Assessment**

The description of science needs in this section is too brief and lacks sufficient detail to allow evaluation as to whether the recommendations are appropriate. A variety of specific science needs are identified in the background text, these should be highlighted as bullets in a similar way as was done for other key scientific questions.

Add recommendation to develop a consistent approach to using biologically relevant concentrations in fate and exposure models, including what is the concentration likely to be transported by different mechanisms.

### **Human Health Effects and Risk Assessment**

This appears to be one of the weaker components of the report.

The section (3.4) underlying these recommendations is very brief and cryptic (e.g., relative to Section 3.5). The determination of health risk should be driven by some assessment of the types and levels of exposures and the primary routes of exposure. Those parameters should also drive the prioritization of health effects research. It is not clear how this was done in the context of health research needs and recommendations.

Interestingly, there is no mention in this section of pesticides as possible contaminants. Are they indeed not of concern for human health effects?

Perhaps this brevity of this section reflects the agency's conclusion that human risks are of less concern than ecological effects in the context of contaminated sediments. If so, this should be stated in the report, with the basis for that conclusion. Otherwise, the reader is left with the impression that the authors are either biased to and/or more knowledgeable concerning ecological versus human health impacts.

To what extent have the derivation of health effects scientific needs and recommendations reflect activity that has or could be expected to occur in the extramural community? Is the list that has been provided here reflective of what EPA can contribute, what is left to contribute?

A number of alternate recommendations involving epidemiology, biomarkers, considerations of key health risks associated with major sediment contaminants could supercede some of those provided here.

C.1 Given the large number of chemicals contaminating sediments, the amount of research that has been (and continues to be) conducted, concerning effects of PCB congeners on health (albeit not in the context of sediments), the appearance of this as the 1<sup>st</sup> "immediate" research need is questionable. The rationale for characterizing risk on a congener basis is not clear, and there is no information presented to suggest that exposures would occur in that context, or that such exposures would be more important than mixtures for example. It is not clear how this key recommendation was derived.

C.3. A basis for making dermal exposures a key research need appears lacking. How does this exposure relate in terms of significance and extent to what might be more typical routes of exposures for larger segments of the population. Are dermal exposures important in the context of total human exposure to contaminated sediments? If not, why prioritize it at this point? Similar questions arise with respect to potential inhalation exposures. How much of a problem are these relative to eating contaminated fish, for example.

C.4 Recommendation C.4 is highly appropriate. There is a great need for better models, or refinements of existing models to include the developing information on endocrine disruptors whose impacts don't fit into acute or chronic very well. As for recommendation A.4, this recommendation should be broadened to include other contaminants of emerging concern, such as pharmaceuticals.

**The recommendations do not adequately reflect the identified science needs, especially for the effects of contaminant mixtures**

As noted for human health effects, associated exposures are likely to be mixtures. What is not adequately considered in proposing that risk assessment should consider additive or cumulative effects. Even in the case of PCBs only, how would decisions be made about which mixtures should be evaluated and what the priorities for that should be. A similar prioritization strategy must then be carried out for structurally non-related compounds. How would this be accomplished? Would it call on the resources and available information from both intramural and extramural sources?

None of the key recommendations address the following science needs:

- Determine interactions among multiple contaminants found in sediments
- Relate the results of bioaccumulation studies in animals/other models to doses in humans
- Studies of mode- and mechanism-of-action for species and mixtures in sediments
- Developing biomarkers of effect and relating these to measurable toxic endpoints

## **Ecological Effects and Risk Assessment**

Most of the recommendations appear clearly defined and appropriate. More prioritization is needed here, due to the large number of recommendations.

D.2. Research to assess long-term risk should include multiple generation exposure tests, including measures of adaptation, associated fitness costs, and effects on gene structure and diversity ("evolutionary" impacts). This can be very important in field studies, and in making laboratory – field extrapolations.

D.3. Research on how to handle uncertainty in the measurement of ecological indicators should be included in efforts to develop interpretive guidance for toxicity tests and other indicators of effect.

D.4. The science needs and recommendations related to bioturbation, dredging, and cap effects are out of place. These items should be integrated into the sediment remediation section.

D.5. The issue of chemical mixtures is slighted in the recommendations section (in favor of more chemical-by-chemical approach). Given that in the case of contaminated sediments, mixtures are more the rule than the exception, a continued emphasis on developing guidelines and TIE methods appropriate for mixtures is needed.

D.6. A justification should be provided as to why there is a need to develop additional single species bioassays, given the competing needs to understand the various factors that modify toxic response, such as adaptation and mixture effects. The research emphasis should include looking in new directions like molecular and protein-based assays.

## **Sediment Remediation**

The key recommendations are generally good and relate well to the identified science needs. The emphasis on coordination with other agencies and organizations is to be commended.

### **Baseline, Remediation, and Post-Remediation Monitoring**

The key recommendations should include development of new real-time monitoring approaches and tools that assess integrative parameters at sites. These are not ready yet but as they develop they can be incorporated into the guidance sheets and protocols.

### **Risk Communication and Community Involvement**

The recommendation to establish a research program lacks the specificity needed to stimulate research in this area. A description on the research activities needed to address the science needs should be included, along with a plan for prioritization of these activities.

The recommendations for Risk Communication and Community Involvement does not appear to make contact with ongoing research in these areas of sociology and public policy. How will these be incorporated into the recommendations?

### **Information Management and Exchange Activities**

The key recommendations are good. The various information networks and exchanges, such as those noted in Figure 3-4, are not integrated. It is hard to get from one to others. They need to have it all, along with NOAA, USGS, ACOE, etc. data linked in a useful way, and better yet integrated. This would be facilitated if they could agree among the agencies on common data collection, recording, storage, and presentation formats.

Recommendations H.1-6 deal with information standardization, management and dissemination. The April 29, 1998 memorandum from Deputy Administrator, Fred Hansen addressed the need

for ensuring the quality of data. That memorandum also indicated that any data management plan recognize “Work by the Center for Environmental Information and Statistics (CEIS) to examine issues raised by secondary uses of programmatic data should be factored into the plan, as should quality assurance efforts currently underway in the Quality Assurance Division in the Office of Research and Development.” Recognizing that CEIS has been merged into the Office of Environmental Information, how is the establishment of an Agency wide sediments data system to interface and coordinate with these pre-existing efforts?

H.5 & H.6. Recommendations to “promote communication and coordination of science” are not useful, unless accompanied by a plan outlining the methods and activities to be conducted.

### **Charge Question No.3c.**

The CSSP obviously represents a considerable effort by EPA to organize and coordinate its activities regarding contaminated sediments. By its very nature, the report helps accomplish the goal of intra-Agency coordination and compilation of relevant activities in Appendix A useful in communicating needs. The reviews understand that this is meant to be a living document which will be periodically updated. We also understand that the recommended science\* is beyond the budgetary constraints of the Agency but was compiled to provide an all-inclusive assessment of important issues related to contaminated sediments. Thus, the comments provided below, related to coordination of activities within EPA and among agencies and stakeholders, are in this context and address how coordination might be improved. Many of the issues that are commented on may have been considered already. In such cases, the comments indicate where the plan might be articulated better.

With regard to this Charge Question, the reviewers comments fall into three categories: Coordination in planning, coordination of research and technology transfer/capacity building.

#### Coordination in Planning

It is not clear how the CSSP links to other planning efforts within the Agency and the overall EPA strategic plan. The CSSP discusses the overall planning links and how contaminated sediments research fits into major GPRA goals, but it doesn't address the details of cross agency planning and priority setting. For example, how does the CSSP articulate with the multi-year planning process for mercury or endocrine disruptors? How does the Metals Action Plan and CSSP link and interact.

It would seem that to meet the stated goals of the CSSP integration of the other planning efforts is required and based on priorities to meet the Agencies needs. A first step might be to utilize the results of the excellent job of compiling the research of the Agency in to one place given in Appendix A. With an updating of this compilation and a more detailed cataloging of research, this information may be used to identify gaps, redundancies and research of low priority. Suggested improvements include the addition of complete contact information, addition of URLs containing program documents/summaries, and the inclusion of relevant projects from other Federal agencies

It is also important in the planning phase to ensure that the stakeholders' and other relevant agencies' concerns are taken into account in identifying the science, related to contaminated sediments, with the greatest real or perceived uncertainty. This should help to focus research and other activities on the most relevant issues.

### Coordination of Research

The recommended implementation strategy for the CSSP (pp. 79-81) includes actions that should improve coordination within the agency. However, these actions are not sufficiently described to permit an assessment as to how successful they will be. The recommendation of an annual meeting to review the status of science activities (pg. 80) is well intentioned, but likely to be too unwieldy to result in substantive discussion/progress. It would be more effective to form smaller (focused) intra-agency task groups to review the status of specific research areas, plan implementation of recommendations, and improve coordination within the agency. Meaningful coordination will not occur unless it is part of a continuing activity throughout the year, not a once a year rush to pull together information from disparate groups.

The key recommendations of the CSSP (starting on p.81) provide a clear indication of offices and programs within the Agency that should be involved in a coordinated effort (summarized in Table 1). Most of the key recommendations list multiple agencies as suggested partners, but the level of information provided by this designation is not sufficient to result in many meaningful coordinations. In some cases the list of partners is too numerous to provide much specificity and no contact information is provided to assist in locating interested partners within each office. If this list is merely a suggestion of future partners, then not much more can be done now, but it should be a priority to develop partnerships among the listed offices. In cases where collaborations or coordination are ongoing, then additional information should be provided (perhaps as a reference to a particular activity described in Appendix A). There is no mention of involvement of States and Tribes and only for recommendations related to Information Management and Exchange Activities are Other Federal Agencies mentioned as partners. Many states (e.g. Florida, California) have invested considerable resources in contaminated sediment science and have developed a number of useful tools for assessing

problems (several mentioned in the CSSP), and NOAA, DOD and the USGS have ongoing programs that directly relate to many of the key recommendations. These groups need to be partners. For example, coordination must be an ongoing process as research moves forward. Coordination of research activities is important throughout remedial process. Contaminated sites (eg., CERCLA and RCRA sites) provide contaminant gradients in the environment that represent important field laboratories for research on approaches to measuring and assessing ecological effects in the environment. Remedial decision-makers are required to make decisions ahead of the science---that is, often great uncertainty associated with the assessments of the degree of impact and predictions of future recovery. Promoting direct link between research activities and site assessment has several important benefits: 1) the participation of research scientists provides direct tech transfer to project managers and regional technical support staff, 2) researchers gain insight into the questions and issues confronting decision-makers and the public in the application of the science; 3) build the database that can be used to evaluate new tools and approaches in different habitats; 4) pilot projects serve as teaching tools. For example, research on new chronic sediment toxicity test endpoints conducted alongside standard tests may provide the project manager with valuable supplemental information on direct toxicity and would contribute to a database that would be useful to evaluating the new endpoints in a variety of habitats and contaminant gradients.

Greater emphasis on coordination of different programs within contaminated watersheds should be addressed. Although the programs that need to address major sediment issues are identified in Section 2.3, it is not clear how these components of the agency actually coordinate in addressing the issues (or the media interactions). Identifying the critical partners at the end of each of the key recommendations (Table 4-1) is a helpful first step, but does not provide much insight on the nature of the coordination required or what form it would take.

Research into developing tools and guidance for the assessment of ecological effects and issues related to "ecological significance" should explicitly include federal trustees. Recommend that EPA request input from trustees on key research issues to identify potential joint research efforts to address issues that directly impact decision-making.

The plan recommends that the CSMC be tasked with the responsibility to identify areas where science partnerships are needed. This approach is inappropriate. The CSSP should contain a summary of areas where partnerships are needed, as assessing the need to form

partnerships requires the same level of technical understanding as does of the process of identifying science needs and providing recommendations. The job of the CSMC should be to help implement these partnerships.

#### Technology Transfer/Capacity Building

The development of new tools, methods and models to assess sediment contamination problems is of little benefit if the products are not marketed. This is accomplished through technology transfer and capacity building activities aimed at getting the products understood and used by stakeholder groups.

The CSSP should have some strategy directed toward capacity building. For example, it is little use to develop an analytical technique for a contaminant to meet stricter regulatory requirements if the ability to accomplish the analysis is only in the hands of a few. New reporting levels, based on new methodology for Hg is a case in point. Training must be in place and funding sources for new technology, when appropriate, must be available.

Technology transfer is not given adequate attention in the CSSP. Project managers and regional technical support staff would benefit from direct access to research laboratory scientists and the ability to develop studies designed to reduce major uncertainties in the information and models needed for decisionmaking. The primary means of technology transfer in the CSSP was holding workshops and development of guidance documents. While these are important elements, greater benefit might be achieved from more emphasis on regional training and technology transfer via pilot projects.

#### Additional comments relevant to Charge Question 3c provided by other panelists.

Fred Pfaender:

- As is common for EPA there is a bad case of "not invented here" thinking. There are many other agencies and organizations addressing the same research efforts defined by this document. In many cases that research is quite advanced and has accomplished some of the goals stated by EPA. There is a large world out there and this document presents a rather myopic view of that world. Appendix A lists

only EPA efforts and does not recognize other effort by ACOE, NOAA, USGS, and others.

- 3.6.4- Dredging/Removal- Most of the science needs in this and other of the remediation sections could be achieved much more readily if EPA were to take a less provincial approach. Much of the progress is being made by contractors, local agencies, and regions. By getting involved in these field efforts EPA program offices and ORD could leverage their efforts and learn a great deal first hand.

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[Re: implementation strategy and timeframe.] In almost all cases the critical partners are within EPA, when in fact most of the critical partners are not. They should identify where in other agencies, companies, universities relevant research and demonstrations are happening and incorporate the ideas and data into EPA's thinking and programs. They do not have the expertise, people, or money to do all that needs to be done, so they need to leverage their work with on-going work of other groups. This has been an issue and problem for EPA for a very long time. It is getting better but still needs a lot of work.

Doug Splitstone

- It is unclear whether the CSSP specifically, or tacitly, recognizes OMB's Guidelines for Ensuring and Maximizing the Quality, Objectivity, Utility, and Integrity of Information Disseminated by Federal Agencies (Fed Reg Vol. 67, No. 36, Friday, Feb. 22, 2002, pp. 8452-8460).
- Recommendations H.1-6 deal with information standardization, management and dissemination. The April 29, 1998 memorandum from Deputy Administrator, Fred Hansen addressed the need for ensuring the quality of data. That memorandum also indicated that any data management plan recognize "Work by the Center for Environmental Information and Statistics (CEIS) to examine issues raised by secondary uses of programmatic data should be factored into the plan, as should quality assurance efforts currently underway in the Quality Assurance

Division in the Office of Research and Development." Recognizing that CEIS has been merged into the Office of Environmental Information, how is the establishment of an Agency wide sediments data system to interface and coordinate with these pre-existing efforts?

Deborah Cory-Slechta

- To what extent have the derivation of health effects scientific needs and recommendations reflect activity that has or could be expected to occur in the extramural community? Is the list that has been provided here reflective of what EPA can contribute, what is left to contribute?

**Appendix H:**  
**WORKING RESPONSES / CSSP CONSENSUS**

## **CSSP Review Panel Summary of Recommendations**

### The Panel's Understanding of the Intent of the CSSP:

1. Identify and compile those contaminated sediment science activities and needs from across the Agency that are determined to be critical in establishing defensible risk-based environmental decision-making.
2. Use the compilation and synthesis of Agency-wide contaminated science activities and needs to promote more effective coordination and communication of science activities across Agency program offices and regions.
3. Establish science priorities across the Agency by determining the extent to which science needs are being addressed by current Agency science activities.
4. Encourage the Agency-wide adoption of a science plan paradigm as a cost-effective approach for establishing science priorities and associated allocation of resources when addressing cross-cutting, multi-faceted, multi-jurisdictional environmental issues.

### How can the CSSP review panel better address the Agency needs?

Beyond those specific technical areas that were either overlooked and/or misrepresented by the CSSP (PCB, dermal exposure, endocrine disruptors), what additional substantive recommendations do we want to make to the Agency with respect to the document?

- A statement of rationale (criteria) to support both the identification of science needs and the chapter 4 recommendations needs to be made explicit.
- Articulation of the selection *process* for science needs and the chapter 4 recommendations—there needs to be a thorough description of the prioritization process that follows directly from the rationale.

Given our understanding of the actual intent of the document and its intended audience, the Panel offers the following recommendations to the Agency. This section is followed by another that addresses the Panel's recommendations for improved methods for preparing a science plan (assuming the function identified in the CSSP).

1. Change the name of the CSSP to more accurately describe what the document offers: The Contaminated Sediment Science Activity and Needs Inventory or *synopsis*. Clarify that it serves as "a foundation for a science plan" but does not entirely serve that purpose in its current form due to the weaknesses noted above. The Agency should make explicit what the "CSSP" will be and the role it will serve.

2. Revise the name given to Chapter 2, and/or revise the section. The Panel's opinion is that chapter 2 offers a summary essay on governing regulations as the context for the Plan. The Panel suggests that the name either reflect that or that the section be better developed. For example: "Overview of major sediment issues across the Agency" The Panel observes that the description of regulatory drivers needs to be sufficient to succinctly couch/justify the Plans recommendations. It might also include who are the primary responsible parties within the Agency for the drivers/activities identified. The overview would benefit from explicit recognition of what the major barriers are to decision making at contaminated sediment sites, and that they have been identified by stakeholders in the field and characterized as science needs.

3. The Panel suggests that the CSSP is useful as as a point of departure for discussion of the rationale for selection of science needs and recommendations. The Panel expressed an interest in further identifying the areas in the CSSP requiring better references. Reiterates the need to consistently identify the lead office for activity (is this a CSMC role?).

4. Catalogue the details identified by Panel contained in the charge question responses. Caveat: the panel did not provide a systematic review for the issue areas, but it is the sum of the panel's comments based on the represented expertise.

Specifically for Future Science Plans (not CSSP)

1. The Panel recommends systematic processes that the Agency may consider for developing future technically defensible science plans.
  - a. Caron's 6 "P"s
  - b. Models contained in Toward Integrated Environmental Decision Making Some key elements are transferrable to the science planning process (The Science Planning Handbook). The Panel opines that future science plans are the primary beneficiary from the Panel's recommendations, particularly with regard to development of a systematic & defensible process in support of the Agency's mission/mandate.
2. Where does the data quality objectives process plug into the CSSP? (Task D.Splitstone)  
Reinforce the importance of the science inventory with additional info on research results.
3. Recommend/comment that financial and personnel resources sufficient to address the task of science plan development be made available. The Panel suggests that the CSSP process reflects inadequate resources dedicated to the science planning process.
4. Coordination  
Extending the plan to include a systematic integration of other agency/research organizations CS research will increase the efficiency of planning and leverage resources. This integration should be part of science planning. It follows upon the internal inventory and identification of need from stakeholders in the field.  
Prioritization of science/research needs is then based on the complete awareness of need and cross-agency activity.
5. Resources for the science implementation  
The Panel opined that a plan disconnected from the resource requirements necessary for implementation is of lesser value. In the interest of implementation the plan needs to consider resources. This can be addressed through a prioritization process of existing identified activity along with ongoing research, new initiatives, etc... The Panel recognizes the value in interagency budget coordination for the leveraging of funds to address resource needs. Although

the CSSP refers to the CSMC as a mechanism for implementation, the Panel recommends that a more explicit statement be made on how the plan is to be implemented.

5. Frequency of plan review.

A five year review may lead to inertia. Review period needs to reflect different levels of review and “new science” timeframes as necessary. How does the CSMC function in this capacity? CSMC meets quarterly – is a review of the plan annually per the budget cycle appropriate? See CSSP page 80. The Panel recommends the development of issues that the Agency should consider in determining review frequency.

6. Outreach and Tech Transfer

The Panel recommends systematic approaches to actively promote the use of products, and evaluation of the use of the tools by target users. Evaluation data should be used as input to design and promotion of science plan revisions and new/revised tools.